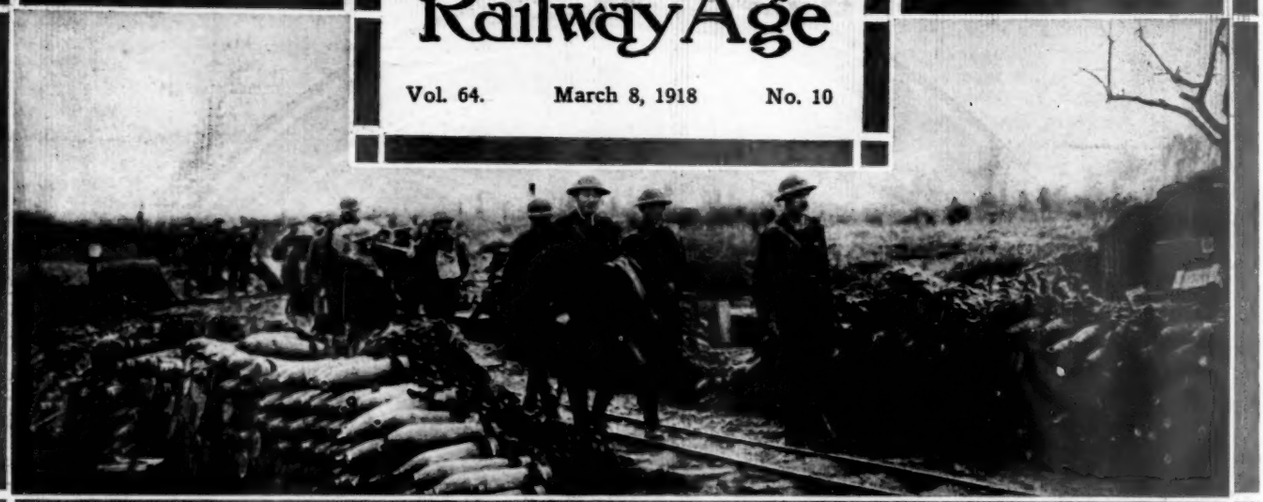
Railway Age

Vol. 64. March 8, 1918 No. 10



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CHICAGO: Transportation Building. **CLEVELAND:** Citizens Building. **WASHINGTON:** Home Life Building.

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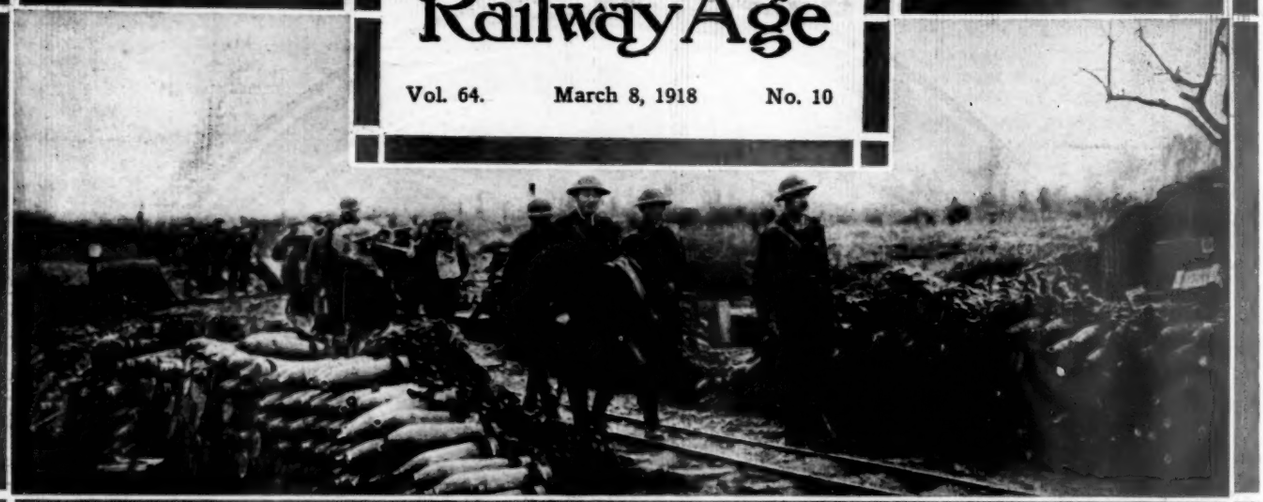

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EDITORIAL

Railway Age

Standardization or Efficiency

UPON THOSE at Washington who are attempting to evolve standard equipment rests a tremendous responsibility. Equipment must be produced that is modern in every respect. It must be possible to operate it as efficiently as the most modern equipment that we now have. If an attempt is made to build either cars or locomotives cheaply by eliminating patented devices which are essential for economies both in operation and in maintenance, there can be only one result—disappointment and a great reflection on those who stand sponsor for the designs.

It would be a national calamity should the equipment be standardized at the expense of modernization and efficiency. The problem is an engineering one and nothing else.

Any drastic standardization of equipment is bound to be reflected in increased operating expenses. It will be a boomerang to those who father it.

There must be no mistake made in standardization!

Be Prepared to Order Cars Promptly

Orders for freight cars are being held in abeyance until Congress has passed the President's railroad bill. The country needs new freight cars. It is plainly evident that some sort of a standard car will be determined upon. Everything must be done, however, to speed the placing of actual orders. The builders were never in better shape to receive orders and any order placed, even at this time, will not be ready for delivery until midsummer at the best. There will be a vital need for new cars next fall and winter. The standardization committees have had sufficient time with the assistance of what has previously been done on the standard car, to formulate definite plans for the consideration of railway men. The men who provide special equipment for the cars must hold themselves in readiness for prompt deliveries. Let everyone cooperate and urge that the matter be handled with despatch.

Truth About The Power Situation

Suppose, Mr. Railroad Man, that Mr. McAdoo should say: "You can have no new locomotives this year." What would your answer be? After the first cry of "Help!" you would wire Mr. McAdoo for money to improve your shops, to add modern facilities to your engine terminals, to modernize your locomotives and to perfect your shop organization. You would set about doing what should have been done years ago, but for which money was not available. The experiences of the past winter have shown, as nothing could have shown, what the lack of up-to-date facilities has meant. It is not so much the lack of locomotives as it is the lack of power. The real work to be done is to modernize the equipment, improve the shop and engine terminal facilities, and increase the rating of the power. If the railraods were allowed to do this we should have a far more efficient transportation system. This is where the real "record" is to be made.

Well-Equipped Train Despatchers

How many railroads allow their train despatchers to study their divisions by riding over the road regularly on local freight and other trains? Or, rather, how many *require* such inspection, and pay the man while he is doing it? This question, asked by a correspondent in our last issue, page 442, is hackneyed, but important. It has been asked regularly for 25 years past, but there is evidence of poor despatching on good roads which indicates that many operating officers still fail to give to the question the correct answer. Despatchers with specially vivid imaginations, and with the necessary energy and ambition, frequently succeed in doing wonderfully well with a minimum amount of knowledge concerning the grades, the engines, the men and the hundred other things which cannot be realized thoroughly without actually seeing them with the physical eye; but it is important to recognize the cold fact that a good many despatchers are not endowed with such imagination, energy and ambition. To be assured that the despatcher will do the best thing in every train-move it is important to make sure that he knows his territory with his eyes shut. And if there ever was a time when poor despatching was costly and good despatching was vitally necessary, such a time is now.

Need for Traffic Representatives

Among the problems which the regional directors and their staffs are now studying at the request of Director-General McAdoo is whether freight solicitation as it existed under private management should continue under government control, and, if not, the changes in methods and organization which should be made. In this connection all railroads have been asked to prepare lists of their traffic-soliciting offices, both on and off their lines, with the cost of maintaining them. Although under present conditions of abnormal tonnage and government operation competition for traffic is a dead letter, it is the opinion of many shippers and railroad officers that traffic representatives perform other services than solicitation which are indispensable. They have done invaluable work during the present period of car shortage by encouraging the heavy loading of equipment by shippers and the prompt release of cars by both shippers and consignees. They have adjusted claims to the satisfaction of both the carriers and their patrons and have assisted in tracing freight for shippers and in routing cars in a way to avoid congestion. It is pointed out that operating officers are so heavily burdened with the details of their own work that they cannot be expected to give proper attention to the individual needs of shippers and consignees. By virtue of their long experience as intermediaries between the carriers and the shipping public, traffic representatives are best fitted to adjust such cases

of misunderstanding and friction as arise between the railroads and their patrons. It is possible that this work can be carried on by a smaller force of men than was necessary under competitive conditions and that outside agencies representing roads in common territories may be consolidated advantageously. The extent to which these changes can be made is the problem which the railways are now studying. It is clear, however, that nothing would do more to create misunderstanding or concentrate criticism against the railroad administration than the abolition of traffic representatives. Under competitive conditions one road profited by the mistakes of another and a premium was placed on service to the public. Under government control criticism will not be confined to one line, but will be directed against the whole transportation system. Consequently, the need for men to keep in close touch with the shipping public is even greater under the present system of railroad operation than in the past.

Recent Developments in the Handling of L. C. L. Freight

MORE ATTENTION has been given to the handling of less-than-car-load freight during the last three or four years than during any decade previous to that time. This has already resulted in a number of interesting developments and will lead to even more important ones in the near future. It has brought to railway men a greater realization of the inadequacy of present methods and facilities for the handling of the large tonnages of package freight now offered to them. This in turn has provided the incentive for the investigation of mechanical means for the handling of this class of business; for the development of multiple-story freight houses to decrease ground rentals; for the construction of union transfer stations for the interchange of l. c. l. freight between roads, etc.

The most elaborate plan for the handling of traffic of this character which has yet been proposed is that developed by the American International Terminals Company for the handling of package freight between Jersey City and New York, which was described in the *Railway Age* of March 1. While adapted directly to conditions existing at that terminal the more important principles involved in the layout are capable of application at other large stations and are therefore of general interest.

The most important development in the handling of package freight within recent years has been the motor truck. While its reception has been relatively slow and there are still many freight houses in which it can still be applied to good advantage, it has shown marked economies in those places where it has been installed and where operating methods have been adapted to its use. It is not surprising, therefore, that this New York terminal contemplates the use of motor trucks throughout.

The suggestion that receiving stations be established at various points on Manhattan Island and in Brooklyn for the collection and distribution of freight for all lines has much to commend it, particularly in reducing the average distance of trucking by shippers and in relieving congestion at existing stations which is now particularly acute along the west water front of New York.

The greatest innovation in this plan is the recommendation for the use of motor trucks with removable bodies for the transfer of the freight between the terminals at Jersey City and the collection and distribution stations in New York. This development is in its infancy at the present time, having been used at only a few points, including Cincinnati and Baltimore. It is showing marked advantages at those points, and it is, therefore, not surprising that this method of transference has been adopted in the New York plan.

These various steps have much to commend themselves to students of package freight transfer, not only in New York, but in the other large terminals throughout the country. The presentation of plans such as these indicate that important improvements are to be expected in the handling of l. c. l. freight in the near future.

Comprehensive Water Treatment Program

AT THE PRESENT TIME when railway men are giving increased attention to water treatment as a means of reducing the number of engine failures and improving locomotive performance, it is necessary that they realize the importance of treating properly all the water supplied to the locomotives under consideration, whether this includes one station, an engine district or an entire division. It has happened too frequently that, after a superficial examination of conditions, those stations on the different divisions have been selected for improvement where the water was most objectionable or the consumption greatest, to the exclusion of less objectionable but nevertheless unsatisfactory supplies at adjacent stations. While the improvement in the character of the water at these isolated stations may be all that can be expected and constitutes an important betterment, full relief cannot be secured in this manner.

A survey of water treatment on railroads made several years ago by the water service committee of the American Railway Engineering Association disclosed the fact that a much larger measure of success was experienced in cases where the water treatment covered an entire division and had taken due account of all waters used on at least one entire engine district. The reason for this is simple. Softened water cannot be used advantageously in boilers containing appreciable quantities of scale or suspended matter. This is demonstrated by the difficulties commonly attending the initial operation of new water softening systems, when progressive disintegration of the old scale in the boilers through the action of the treated water causes foaming and a reopening of scale-closed leaks at first, although these troubles are readily overcome under a properly considered water treating system as soon as the boilers become free of scale.

This fact points to the need of keeping the boilers clean, a condition which cannot be fulfilled as long as appreciable quantities of encrusting solids are being introduced into the boilers at certain water stations, no matter how perfectly the treatment may be carried out at other points on the same engine district. This does not necessarily mean that a complete system of treatment must be provided at each water station, for in some cases the water may be naturally non-encrusting, while at other points a modified form of treatment may be sufficient. Again some waters carry large amounts of material in suspension and but little in solution, so that a filter or settling basin will suffice to produce a satisfactory water. Each water must be studied as an individual case and the necessary corrective measures applied as indicated by the investigation, keeping in mind that the ultimate object is to keep all bad water out of the boilers.

The simplest problem in feed water treatment is encountered with engines in switching and transfer service which take water from a single source. Some of the best records for life of boiler flues have been obtained in the case of engines of this class, using only the treated water coming from one terminal water station. In the case of passenger locomotives also, the problem is relatively simple, for the provision of good water at terminals and at one or perhaps two intermediate stations will often be adequate for this

class of engines. The most difficult problem and the one whose solution is most important is that created by freight engines taking water at each roadside station and frequently running over two or more engine districts radiating from one terminal.

It is evident that only limited benefits can be secured from even the most successful treating plant at one station if the others from which an engine also takes water are supplying untreated water of objectionable quality. Therefore rather than selecting the worst points on several divisions for attention, the best results can be secured by concentrating attention on one district or division at a time and the greatest returns for the expenditure can only be secured in this way.

Controller Williams on the Breakdown of Railroad Credit

WE PUBLISH on another page a letter written by John Skelton Williams, controller of the currency, to the Interstate Commerce Commission on November 1. That was over four months ago, but the letter is almost as interesting reading now as it would have been if it had been made public then. Mr. Williams had already given utterance in the press to some of his views on the railway situation. The letter which we are now permitted to publish was intended only for the eye of the commission and was a much more complete discussion of the state of railroad credit, its causes, and the effects it was producing than was contained in Mr. Williams' public statements.

There has been and will continue to be much discussion as to why government control of the railways was adopted. There really were two reasons, one financial, the other operating.

The financial condition to which the railways had been brought has never been more strikingly shown than in Controller Williams' letter. He presents statistics demonstrating that there had been a shrinkage in the market value of the stock of 12 leading railways since 1906 of $1,697,000,000, or 51 per cent. The general shrinkage of values, of which the cases of these 12 roads were merely illustrations, had impaired the investments not only of hundreds of thousands of individuals, but also of many of the most important financial and fiduciary institutions of the country. Mr. Willams called attention forcefully to the reduction in the average rate per ton per mile which had taken place since 1908, at a time when wages and the prices of materials were greatly increasing. As he made clear, the collapse of railway credit was due to a repressive policy of railroad regulation, which had prevented rates from being advanced enough to offset increased expenses.

A little over a month after Mr. Williams wrote his letter to the Interstate Commerce Commission, that body sent a special report to Congress. Mr. Williams had strongly recommended an advance of rates. The commission said that no increase of rates it could give would remedy the financial situation of the railways, and recommended government guarantees to them. Only the certainty that the policy of guaranteeing the net return of the carriers was going to be adopted has prevented serious further declines of the value of their securities. It is well to have the reasons for the financial condition to which the railways had been reduced before government control was adopted set forth authoritatively at this time by a high government official so well situated to understand and so competent to present the facts as is Mr. Williams. Perhaps it is a good omen that the man who wrote this letter has since the adoption of government control been made one of the advisors of Director-General of Railroads McAdoo and placed in charge of the division of purchases and supplies.

As already stated, there was an operating as well as a financial reason for the adoption of government control. President Wilson decided that the railways could be more efficiently operated under government than under private control because, as he said, there are some things which the government can do which private management cannot do. As the existing transportation facilities were being operated, it had become impossible for the railways, and especially the Eastern lines, to handle all of the available business. They have continued under government control to be unable to do so, and it is a safe prediction that unless facilities, and especially those of the Eastern lines, are largely increased, this condition will last indefinitely. It is charged in some quarters that "private management had broken down." On the contrary, private management was moving more traffic in proportion to the number of men employed and amount of facilities available than it ever did before. Mr. Williams makes clear in his letter that the breakdown of the credit of the railways was due to the refusal of the regulating authorities to let them make needed advances in their rates. Their failure to provide enough facilities, in its turn, was due to the breakdown of their credit. The reasons, both financial and physical, which made necessary government control go back, then, to the kind of regulation to which they had been subjected. Of course, the traffic which they have been called upon to handle during the war is not only vastly larger than that of a few years ago, but has been made abnormally complex by the conditions of war. But fundamentally, the past and present inability of the railways to handle all the available business is due to insufficient facilities, and the insufficiency of facilities is directly traceable to the fact that for almost 12 years before the adoption of government control they were subjected to a policy of regulation which was adapted to and did finally break down their credit.

The Interstate Commerce Commission has not yet decided the case involving advances in rates which called forth this letter of the controller of the currency regarding the condition of railroad credit. It will be interesting to see when the decision is rendered whether the developments of the last few months have had any influence on the commission's views regarding the way in which rates should be regulated.

Standard Locomotive Repairs

THERE ARE MANY OBJECTIONS to the adoption of universal rigid equipment standards which have received considerable attention since the investigation of the standardization of cars and locomotives has been in progress at Washington. Little has been said, however, about the relation of the locomotive standardization plan to the maintenance department. This is a matter which should be given careful thought, especially when considering the adoption of standard types of locomotives under present conditions. There are many railroads, including most of those now of the greatest importance to the nation, which have been slowly developing their own standards of locomotive construction for many years. The purpose has been to develop interchangeability in order that the stock of spare parts and material may be kept at a minimum and that these parts may be made on a manufacturing basis. As the details and, to some extent, the classes of locomotives, have become standardized, special shop equipment has been provided to make possible the economical centralized production of the finished parts needed in the maintenance of the power. Patterns for a large number of castings have been made applicable to several classes of engines, turret lathes, and in some cases, automatic machines have been provided for the quantity manufacture of motion work pins; jigs, templates and flanging forms have been designed for the performance of standard opera-

tions; the sizes and tapers of bolts have been standardized in order that standard drills and reamers may be supplied to all repair points on a system and repair practices retained under effective control. To impose an entirely new design of locomotive upon the maintenance departments, differing in all respects from the local standards evolved on each road, would at any time result in considerable disorganization and loss of efficiency in the operation of shops. There are already many extraordinary difficulties to be overcome in order to keep up the output of locomotive repair shops. Under these conditions, when a national crisis demands the utmost from these organizations, the wisdom of throwing such an additional burden of disorganization upon the maintenance departments is very doubtful.

The Shepherdsville Collision

CHIEF INSPECTOR BELNAP reports the Shepherdsville collision of December 20 as due to the negligence of (1) the leading train, No. 41; (2) the following train (No. 7), and (3) the operating officers of the company. The language in which he sets forth this conclusion is quoted on another page. The failure of the flagman of No. 41 must include his failure to use fusees, though the report has nothing special to say on this point. If trains are to be spaced by time alone the use of fusees (or torpedoes) is always an essential element, for the distances between stations, and the length of time which the flagman may take, in any given case, to get back with his red flag or lantern, are so variable that they can never be fully provided for in any general rule; and a general rule is our only protection, for no flagman can be expected to know enough of the circumstances of any particular case to be able to exercise his own judgment. To get along by the exercise of individual judgment is an experiment that was tried for half a century and had to be admitted a failure. In place of that expedient, the only practicable recourse, aside from the space interval, is the use of fusees. Fusees, however, besides being costly, introduce new difficulties; so that, in the light of extended and varied experience, it is not very strange that they afforded no protection in this case.

As to flagging *per se* (excluding the question of fusees), it may be said that if the flagging rule ever fails, this was one of the occasions where failure would be liable to occur. The train had station work to do, making it easy to be careless in counting minutes; the following train, No. 7, had a clear view for more than a mile and had the warning of two good red lights on the rear car of No. 41; and it was running under a rule requiring the speed of the train to be kept under control so that it could be stopped within the very short distance of six hundred feet. However, though the conductor and the flagman of No. 41 violated plain rules, it is impossible (unless one had been acquainted with the men, their personalities and their records), to discuss their failure any farther, for they have paid the extreme penalty for their negligence, and their mental processes on that fateful evening are a sealed book. These men took a risk which, no doubt, seemed to them small, but which proved to be great. The country-wide accident records of the Interstate Commerce Commission would show, no doubt, numerous other cases, quite similar, within the same month.

Engineman Wolfenberger's negligence is characterized as a "material contribution." To many railroad officers this will look like an inversion of the true relation; his dereliction will be classed as the chief immediate cause of the collision. His testimony as to speeds, and as to when he first saw the train-order signal; when he whistled, when he applied brakes and to what extent, and the testimony of other persons on these points, are subject to a good deal of doubt as to their accuracy; but it is difficult to believe that if both the engineman and the fireman had been keeping a good lookout they would not have seen the two red tail lights of the train ahead.

To take no special pains to reduce speed, or to see the change in the color of the train-order signal was, evidently, habitual; and the omission of the engineman and the fireman to confirm each other's reading of fixed signals was not only habitual, but was approved by their superiors. Enginemen of the highest grade employ this monitorship habitually; and they appreciate its value, whether it is required by the superintendent or not.

The company's responsibility is put third; but the public will be likely to put it first. The officers of the state or federal government would necessarily look first to the company, as they have no way of dealing directly with enginemen, conductors or flagmen except by criminal prosecutions. Probably if there were more criminal prosecutions of employees who cause people to be killed by violating the rules of safe operation, the number of bad accidents would be reduced; but our public officials and juries seem incurably reluctant to apply the law of manslaughter in such cases.

The astonishing thing about this collision is that a prominent road, which is reasonably prosperous, and which has introduced automatic block signals on hundreds of miles of its lines, should be operating a section of its most important main line with no space interval at all! The management of the Louisville & Nashville has many characteristics of enterprise and has spent millions of money for safety; yet here neglected a lesson which has been displayed on the railroad screen, in giant letters, under the brightest light, for the last thirty years. The daily papers, as a matter of course, at once turned their heaviest guns on the wooden coach, ignoring the impossible problems which face the railroad manager who would introduce steel cars throughout his lines at a single stroke—or even in five years; but the railroad manager cannot ignore the fundamental principle that, in the matter of collisions, it is his duty to prevent them, not merely to mitigate their effects.

The company's statement said that the line was operated under the standard rules of the American Railway Association; but that declaration has little meaning, for everyone acquainted with the Standard Code knows that innumerable safeguards necessary in train operation are covered by the rules only in the most vague and general way. The code is no more a guarantee of safety than is cold water in the boiler a guarantee that the engineman will ever start his train. The company might have added, with truth, that so far as concerns clear and forceful language, lucid arrangement of subjects, and careful attention to a thousand details, its own code of rules is one of the best in the country; but the rules for train operation are nothing but a skeleton at best. This was a case where the time interval system was of no value except as it was supplemented by flags, torpedoes and fusees.

That the road should report the block system as in effect when in fact it was not, and repeat the declaration year after year, is inexplicable. The existence of train-order signals at the stations of the Louisville & Nashville, with operators in attendance, made it possible to operate the block system at any time; but a rule that is suspended completely and permanently can hardly be called a live rule.

But if no block system had ever been invented, the explanation offered by the road would still be grossly inadequate. Whether or not there had been proper inspection to test the intelligence and fidelity of flagmen and conductors in protecting the rear of trains is a point on which Mr. Belnap's report has nothing to say; but whether this was done and proved ineffective, or was neglected because these men had never got into serious trouble, is perhaps only an

academic question now. In any event a discussion of this point could only go over old ground.

The question whether there had been inspection to see that enginemen properly heeded the rule requiring them to slacken speed for the purpose of seeing the operation of every train-order signal is already answered, in the negative, by the admission of the engineman, before the Kentucky commission, that motionless signals were accepted by enginemen, habitually. Indeed, the fact that fast trains could not obey the rule in times of fog without losing time, seriously, gives ground for the conclusion that the neglect of this rule must have been well known.

The railroad company will, no doubt, take the government's advice to put the block system in operation on this section of its road. The public will be interested to see whether that system is better enforced than was the old system. It undoubtedly will be, for when the management of the Louisville & Nashville does apply itself to doing a job particularly well it always succeeds in doing it well.

Railroad Rates as a Means of Taxation

THE NEW YORK TRIBUNE editorially commends to the consideration of Congress a plan for increasing freight rates to an extent (the Tribune suggests 100 per cent increase) which would yield the government a large surplus over and above its guarantee to the companies. The Tribune says: "No form of taxation yet devised could reach all of the people of the country more surely than a tax on freight." The Tribune's proposed increase of rates is to be solely as a war measure and solely for the duration of the war. The Tribune apparently forgets that there is now a tax both on freight and on passengers as a war measure. The proposal to increase freight rates as a tax is, we believe, founded on unsound principles and it is open to the greatest dangers both economically and politically.

The *Railway Age* has already advocated the establishment of rates which will furnish net operating income ample to meet the government's guarantees. Every commercial product as well as every product of mines, agriculture and forests has two primary measures of value: one, its inherent qualities; the other, its relative geographical position. The factory, the mine, the farm or the lumbering camp produce—manufacture—the inherent quality of the subject. Transportation produces—manufactures—the other element of value—relative geographical position. In modern life only a fraction of the products of factory, mine, farm or forest are consumed where produced. To all the rest must be added transportation. Transportation is therefore in the nature of a part of the process of production; it is that part of the process which produces geographical position. Geographical position is as necessary an element in consumability as are the inherent qualities of the article itself.

It is a fundamental economic mistake to put a tax on production. Such a tax is essentially different from a tax on profits from production. One tends to restrict production, the other to the adoption of economies in production. Just the minute you begin to use railroad rates as a part of the taxing power of the federal government you will get the railroads into politics in the same way that the tariff question has been in politics. The equitable freight rate is a fine blend of the value of the service with the cost of the service. It is true that if you adopt as a guiding principle the rule that the government must at least receive net operating income sufficient to meet its railway guarantees, you lay stress on the cost of service; but this is as it should be.

Now is the opportunity of more than a generation to readjust the rate fabric of this country. Competition in the first place and a shortsightedness on the part of the Interstate Commerce Commission in the second place have left a rate structure that is quite illogical. With the government as the recipient of any surplus over its guarantees there is an opportunity to go at this rate structure in an open-minded, broad way that ought to work great good to the industries of the country as well as to the consumers. To use this large opportunity, however, as means of taxation, would be a serious blunder.

Reforms in Passenger Service

GOVERNMENT CONTROL is beginning to effect some important reforms in railway passenger service which the *Railway Age* has been advocating for years, but which it was impracticable to secure while the unrestricted competition required by law prevailed in the railroad business.

This paper has called attention many times to the wasteful duplication of passenger train service between cities in all parts of the United States. One of the examples on which we have often commented has been the service between Chicago and St. Louis. Four railways operating between these cities have run 15 trains a day from Chicago to St. Louis and the same number from St. Louis to Chicago. The trains on the different roads have departed and arrived at destination at practically the same time. In consequence, although there were 15 trains, there were only five times in the day when a passenger could leave Chicago for St. Louis. We have repeatedly remarked that if, in such cases as this the number of trains was reduced and they were so spaced as to leave at different times, a large economy would be gained, and at the same time the service rendered to the public would be improved.

A reform in the Chicago-St. Louis service is now to be made. The number of trains is to be reduced from 15 to 9, and they are to leave at eight different times in the day. An article giving the new schedule is published elsewhere in this issue. Under the new schedule, a large economy and the improvement in the service which long have been practicable, will both be attained. There are many other cities in the country the passenger service between which is susceptible of similar reform, and it is understood that like action regarding the service between these other places is to be taken by the railroad administration. It is to be regretted that changes along this line had to be deferred until government control was adopted, but the managements of the railways should not on this account be too severely criticized. The law has required them to compete, and duplication of passenger service has been a result of law-enforced competition.

Another reform which this paper has advocated for years has been the consolidation of the ticket offices of the railways in the various cities. The multiplicity of city ticket offices, like the duplication of passenger service, has afforded an opportunity to effect reforms which would save the railways money, and at the same time promote the convenience of the public. Under the system under which each railway has had its own ticket office, if a traveler wished to go from Chicago to St. Paul, for example, and could not get sleeping car space on one road, he had to go to the ticket office of some other road, which might be a considerable distance away. With a consolidated ticket office, if he could not get sleeping car space on one railway he could without leaving the office buy space in a train on some other railway. The St. Louis lines some years ago grouped their ticket offices so as to effect substantial economies and at the same time promote the convenience of the public. Since government control has been adopted it has been decided to consolidate the ticket offices in Washington; and it is understood that this is a forerunner of similar action in

other cities. The reason for the multiplication of ticket offices in the past has been the same as the reason for the duplication of passenger train service.

Another reform in passenger service which government control probably will soon accomplish will be the abolition of the indiscriminate and wholesale reservation of space on sleeping cars. Our railways in the past have given passengers the privilege of making as many reservations as they have pleased, at as many times as they have pleased. This privilege has been grossly abused, and its abuse has cost the railways and the Pullman Company millions of dollars a year. Whenever people, especially in the large cities, have thought that they might want to make a trip they have reserved sleeping car space. The railways have had to put enough cars in their trains to accommodate all making reservations. A large number of those who have made the reservations and who have later decided not to make the trips they contemplated, have either canceled the reservations a short time before the hours of departure of the trains or have not canceled them at all. In consequence, all over the country the railways have run cars which have not been properly loaded. The remedy for the abuse of the reservation privilege is to require passengers when they make reservations to pay cash for their railway and sleeping car tickets. Of course, if they do not make the trips they contemplate their money will have to be refunded but when people are required to pay cash for reservations the number of them made will be greatly curtailed and the number of cars run half-loaded will be correspondingly reduced.

There are various other reforms in the handling of passenger business which long have been needed and which can be made in such a way as to save money for the railways and at the same time not materially inconvenience the public. It is to be hoped that under government control many of them will be so completely accomplished that the old abuses will not be revived after government control is terminated.

Pennsylvania Railroad Company

THE INCREASE IN THE TONNAGE of freight handled was not apparently the primary cause of the unprecedented strain which was put on the Pennsylvania Railroad in 1917. It is hard to overstate the extent of this strain. Transportation expenses—the out-of-pocket cost of actually moving freight and passengers—increased by $24,540,000 and totaled $104,935,000 in 1917. This is an increase of 31 per cent. There was congestion and delays to ordinary freight and passenger trains, such as had never before been experienced, and yet the total tonnage of freight carried in 1917 amounted to 169,647,000 tons, an increase of only 3,402,000 or 2.05 per cent. It is true that the average haul of each ton of freight was somewhat longer so that the total ton mileage amounted to 27,791,000,000, an increase of 3.06 per cent over the ton mileage of the previous year. It is also true that there was a tremendous increase in passenger business. The number of passengers carried one mile totaled 2,524,000,000, an increase over the previous year of 16.39 per cent; but as a matter of fact, by curtailing regular passenger service, the Pennsylvania was enabled almost to offset the mileage made by special troop trains. Passenger train mileage totaled 31,759,000, an increase of only 2.61 per cent over the previous year.

To adequately understand these figures and to get some conception of the burden put on the management and employees and the heroic efforts which were put forth to carry this burden, it is necessary to describe briefly the situation at the beginning of the calendar year, 1917.

The Pennsylvania Railroad directly operates 4,541 miles. The main line runs from New York via Philadelphia through Harrisburg to Pittsburgh. Branching out from this main line, are a network of lines connecting the principal traffic centers as far south as Baltimore, Md., and north to Wilkes-Barre, Pa., Rochester and Buffalo, New York, and Erie, Pa.; thus the Pennsylvania Railroad serves the great manufacturing, industrial and commercial center of the United States.

Notwithstanding the fact that huge sums have been spent each year for many years on additions and betterments and these sums have been expended with keen foresight as to the trend of the developments of traffic, the physical plant at the end of 1916 was being operated within a very small percentage of its full capacity. This could be said of no other railroad of the size of the Pennsylvania. It is hardly necessary to cite even the most impressive of the great undertakings which the Pennsylvania has completed in recent years, in the attempt to keep its railroad up to the requirements placed on it. The New York extension, costing over $100,000,000, and the double track low-grade line from Harrisburg to Philadelphia, costing as it did $40,000,000 and being an addition to a four-track line already existing between these two cities, are two examples. On an average $30,000,000 a year was expended for fifteen years for additional terminal and yard facilities. The credit of the company was used to the full extent that it was considered safe to use it. If the profits which the company had been making had provided a better credit far greater facilities would have been provided. The fact was recognized that although a very large amount was being expended for such purposes it was not as much as should be spent. The road had reached the point of saturation by the end of 1916.

There is another feature which must be borne in mind. The organization, by which is meant the officers and employees of the Pennsylvania, is unique. The aim of the development of this organization has been to take in young men, to train them carefully and fully, to treat them so well as to insure their remaining with the company and to operate the property along scientific lines which require skill and long practice to understand and effectively to carry out. The piece of machinery is so huge, its complicated parts fit one within another so intricately, that the loss of a single part is liable to cause endless confusion.

W. W. Atterbury, vice-president in charge of operation, was in September appointed director general of transportation for the United States in France and later was made brigadier-general. More than 11,000 officers and employees of the Pennsylvania entered the service of the United States. Through death, the Pennsylvania lost Simon C. Long, general manager, George W. Creighton, general superintendent of the Eastern Pennsylvania Grand division, George W. Boyd, passenger traffic manager, and Robert H. Large, coal traffic manager. It is not that younger men had not been trained to replace and do the work of Mr. Atterbury and of the executive officers who died, but was rather the combination of all the circumstances, the loss of Mr. Atterbury's services, loss of the trained services of 11,000 others who went into the war service, unprecedented passenger service demands, and what has not heretofore been mentioned, but what is of the very greatest importance, the mass of preference orders from the government, many of them at times contradictory, and a hopelessly confusing change in the ordinary channels of traffic. At one time 85 per cent of the total freight traffic was subject to preference orders. Moreover, 177,000 new men were hired in 1917. This is at least four times the number of men that had been taken on new in any previous year. Is it any wonder that there was congestion and greatly increased expense on a road 4,500 miles long that was trying to do a freight business alone exceeding over 60

per cent of the combined annual ton mileage before the war of all the railroads of Great Britain and France.

Notwithstanding all the extraordinary difficulties, the average trainload in 1917 was 872 tons; an increase of 62 tons over the previous year. The average loading per loaded car was 32.17 tons; an increase of 2.94 tons. This is an achievement which every Pennsylvania man may well be proud of.

The total operating revenues in 1917 amounted to $255,930,000, an increase of $24,815,000 over the previous year. Total operating expenses amounted to $200,588,000, an increase of $34,424,000. After paying largely increased taxes and increased interest charges, there was $39,282,000 available for dividends. This was less by $12,995,000 than the amount available at the end of 1916. Regular dividends of 6 per cent called for $29,951,000 and sinking funds called for a little over $2,000,000 more. The remaining $7,000,000 the Pennsylvania appropriated toward the quarterly dividend which was paid February 28, 1918.

During 1917 $25,579,000 was spent for additions and betterments and $8,494,000 for additional equipment. Of the twenty-five and a half million dollars spent for additions to terminal facilities, additional track, etc., less than half, probably, was spent on improvements which were actually available during any part of the year 1917. For instance, $11,555,000 was spent for the purchase of property for terminal facilities and for right of way.

The taking over of the operation and assets and liabilities of the Pennsylvania Company, which operates the southwest system of the Pennsylvania Lines West and controls their stock ownership, and the other Pennsylvania Lines West, has been previously commented on in these columns. The figures, of course, in these comments do not include any of the Pennsylvania Lines West. The Pennsylvania has acquired almost all of the minority stock of the Long Island and now owns 99.16 per cent of all of the stock of that company.

At the end of the year the Pennsylvania had on hand $17,764,000 cash, an increase of $3,686,000; but no time drafts and deposits which latter, at the end of 1916, amounted to $48,374,000. Loans and bills payable amounted to $14,317,000, a decrease of $21,688,000. During the year the company sold $60,000,000 general mortgage 4½ per cent bonds, charging to profit and loss $3,266,000 discount. It was from the proceeds of these bonds that the company paid off the loans and bills payable as noted above—the principal payment being $20,000,000 of 4½ per cent notes—and also paid for the new equipment and additions to road, terminal facilities, etc., previously mentioned. There are available $21,000,000 additional general mortgage bonds which have previously been authorized by the stockholders, and the stockholders are now asking to authorize an additional $75,000,000 of these bonds so as to make a total of $96,000,000 of bonds which the directors can sell on such terms as are possible.

The table below shows the principal figures for 1917 and 1916:

	1917	1916
Average mileage operated	4,541	4,536
Freight revenue	$176,927,084	$164,226,792
Passenger revenue	52,938,945	44,907,476
Total operating revenue	255,093,495	230,278,533
Maintenance of way and structures	29,610,653	28,819,322
Maintenance of equipment	52,612,430	45,805,126
Traffic expenses	2,850,787	2,534,360
Transportation expenses	104,934,728	80,394,313
General expenses	6,409,932	5,509,430
Total operating expenses	200,588,086	166,164,582
Taxes	10,199,823	9,022,399
Operating income	44,264,408	55,056,012
Gross income	65,983,652	78,220,874
Net income	39,281,585	52,276,504
Sinking Funds	2,187,027	2,138,959
Dividends	29,951,099	29,952,253
Appropriations for additions and betterments	.....	9,214,925
Additions and betterments to branch lines	.....	3,713,786
Appropriations for 1918 dividends	7,143,459	.....
Surplus	.....	7,256,582

Letters to the Editor

The Labor Situation and Its Effect Upon Clerical Forces

DANVILLE, KY.

TO THE EDITOR:

While the writer, like practically all other railroad office men, holds the opinion that he is not being paid as much for his services as they are worth, he desires to have it understood that this communication is not written with a selfish motive, and that it is not to be taken in the light of a class protest. The writer is a railroad clerk and has been for ten or more years, but he has been for some time in charge of an office in which a number of clerks are employed. He has had some experience in employing and handling clerical forces, and therefore feels qualified to sound a warning regarding the present situation, and the probable future situation under existing conditions, with particular reference to the quality of labor available for clerical positions. He will endeavor to place himself in the position of an employer of clerks, which, in fact, he is, as he not only employs them but is responsible for the work which they do, or do not do.

In the first place, there seems to be a disposition on the part of officers who handle labor matters in general, such as rates of pay, hours of service, and working conditions, to consider clerical labor hardly worth the same serious consideration that is given train and enginemen, shop forces, and the employees in the maintenance of way department. The idea seems to be that clerks do not produce anything, that their work does not, except in an indirect way, affect operation; that it is easy and no especial intelligence is required to handle it, and therefore, that the heads of the offices should be able to continue to keep an effective force at the same old rates or at very slightly increased rates.

As a matter of fact, under the present conditions, the clerical labor situation deserves very serious attention if railroad offices are to meet the demands made upon them. In the first place, some classes of clerks, such as yard clerks, bill clerks and station forces, do affect operation as vitally as telegraph operators. In the second place, the requirements of the Interstate Commerce Commission, and the increased demand for accuracy in records of all kinds, call for a very much higher degree of intelligence in accounting and in the various other classes of office work than when railroad office salaries were high in comparison with the salaries paid for similar classes of service in other industries. Under the old conditions excellent material was available from which office men could be drawn. But the quality of the material available for this class of work has been steadily deteriorating for several years, until at present, the head of the average railroad office is hard put to maintain an organization with which he can turn out work which will not keep him in hot water continually.

The standard of education is very much lower in the material now available; initiative, judgment and loyalty are so rare as to cause surprise, and it is next to impossible to build up an efficient organization and to maintain it.

Girls and women have been and are being used to fill the gaps in many offices, and it may be said of them that in some cases they fill them well. Female clerks are as good, if not better, than male clerks in some positions, but they are not always suitable for use as bill clerks in the yard offices, and for use in some of the agencies and division offices. The working conditions in these offices are not favorable for the

retention of women of the class likely to be efficient and likely to have the necessary education.

The present situation, then, is that the standard of the work required of office forces continues to be raised, and the quality of the labor available to handle the work continues to deteriorate. What is the cause of this condition? The answer—two words—salary, opportunity. The remedy, in the opinion of the writer, lies in the same two words. Another general increase? More expense? No, not a general increase, a little more expense probably, but not much, nothing like so much as it looks at first glance.

The trouble lies in the method of organization. Clerical workers cannot be handled like shopmen, operators, or trainmen; they should not receive class rates. The men we need for office work do not fit in with that kind of an organization. Office work is not, strictly speaking, a trade or a profession. With the class of men we want it is simply a means to an end. This class of men take up office work for the experience it gives which will fit them for the more or less important official positions on the railroad or in other business. They want promotion to executive positions, they want to get somewhere—the class we need and want, understand, not the class we are getting.

Clerks, or the class we need for the office work now required, are not trades-union men, they are not of the type that takes kindly to trades-union principles; they are, and if we are to get the class of service we want, they must be of the executive type. They would never be content to serve an apprenticeship at the less important desks and then be satisfied to settle down as mere clerks for the balance of their lives. A different order of intelligence is required for clerical positions; they must offer advancement and encouragement. The men must see themselves a little further along each year, or at least see prospects of promotion. If they are satisfied without this they are not of the best type for office men.

Under the present method of organization, which is more or less common to the railroads of the country, there are too many positions that pay practically the same salaries—$60, $65 or $75. The writer knows of one division office in which there are five $75 jobs in the timekeeping and personal record department. The men on these jobs are good men in their way, but not one of them has been in that office longer than one year and the timekeeping force is constantly changing. When some one steals the chief timekeeper the office head has to steal another from some other road where the rate is lower.

How much better would be an organization, the total salaries of which would represent practically the same outlay, with the clerical compensations graduated so that the new man received $65, the next $70, then $75, $80 and $85. The work could be arranged so that the importance and the responsibility of men would increase with the rates of pay and promotions would follow as vacancies occurred. The $85-man, having been through the whole mill, would be the logical man for his chief's job when the chief stepped up, and the quality of service given by the whole organization would be very much higher.

The graduated wage scale is the ideal for office work, and there should be a definite and comparatively inflexible path of promotion. Thus ambition would be kept alive, the mind kept active and broadened by reaching ahead for the details of the next job, and the new man would be broken in—where he could do the least damage—on the job of the least importance. True, there would be some little disorder when everybody moved ahead, but this would not be serious. As all would be more than fairly familiar with their new duties, the organization would work down to the usual or perhaps greater efficiency in a few days, and every one would feel that he was getting somewhere.

The opportunity for promotion need not end in the office and should not end there. Men of the stamp that a good system of advancement would attract and develop would make good officials in some positions, if they were permitted to get some outside experience as they went along. Send them out regularly to look up something concerning the work on which they are engaged at the desk. Have them go with the division officials occasionally on their various trips of inspection. Let them see both sides of the work and become familiar with the actual conditions about which they write and which they record.

Each office man should make periodical trips over the division and over other divisions, under the supervision of field men who will explain matters from the field man's point of view. Under this arrangement the interest in the work would increase greatly. The men would know what they are writing about. There would be fewer foolish letters, and by the time a man reached the chief clerk's desk, he could, with a few week's coaching, make a valuable man in many of the minor official positions, having gained by experience a fairly good grasp of both theory and practice. Office men are quite generally promoted to official positions in the freight and passenger traffic departments, and these departments get good men. The same could be done in the operating department if the rudiments of the outside work were taught during a term of several years, as suggested above.

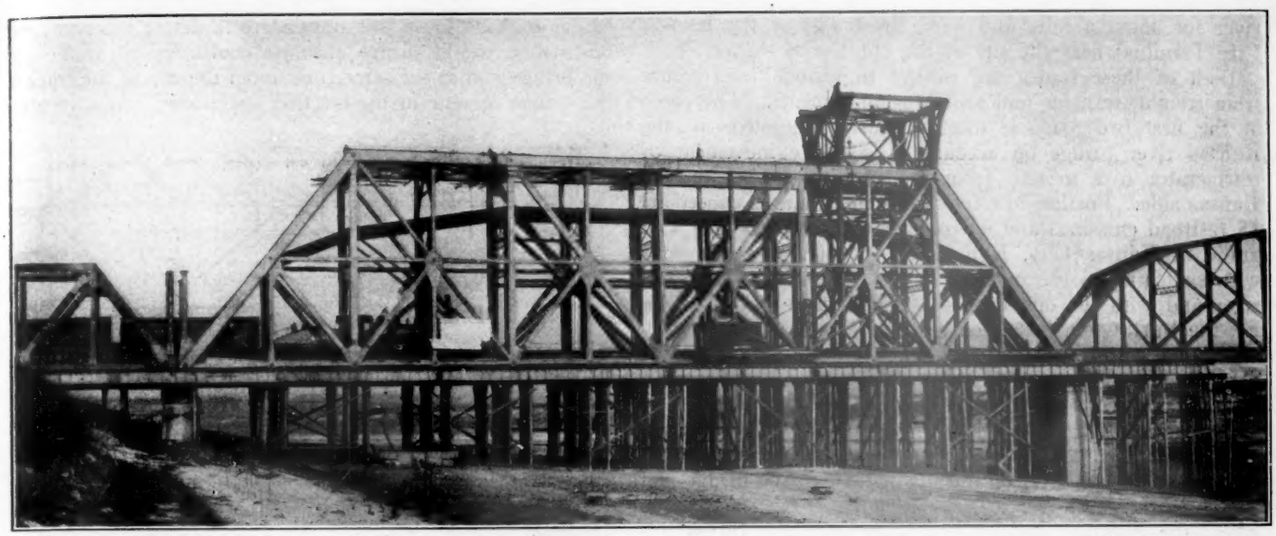
The same system of graduated salaries, suggested above, could be worked out even in the great billing offices in the cities, for though the work cannot be so easily divided as to importance and responsibility, it *can* be graded to some extent. With the possibility of a gradual promotion and increase in compensation before them, a much more intelligent class of men could be secured for these positions.

Unionism would be a highly undesirable thing in the offices, both from the standpoint of the railroad and from that of the men, but office men are being driven towards it. The average clerk does not want it, and if he can see fair prospects without it he won't have it. But there is imminent danger that it will come to a real union, as strong as the telegraphers, or the trainmen, under the present conditions, and with the union a much poorer quality of work will be turned out. Or if, as is possible, we avoid the union because the men with spirit enough to form one seek employment elsewhere, we shall in time be forced to do work that should be handled by men of keen intelligence, with spiritless drudges, rejects and failures, and the word "clerk" will deserve the more or less good-humored contempt which is already beginning to be attached to it.

CHIEF CLERK.

MEXICAN WAR TANKS.—A large Mexican oil company during each year assembles all of its tank cars for repairing. In search of three cars which had been side-tracked in the territory formerly dominated by Villa, a party representing the company espied what appeared to be "British armored tanks." On investigation, it was found that the Mexicans had drilled three holes in each side of the cars and had installed six machine guns in each. It was so furnished that eight men could comfortably be seated and entrance was made through an opening at the front of the car.

EUROPE'S FREE PORTS.—In the free ports of continental Europe merchants can ship goods through a free port either by arranging with a shipping company, whose vessels call at the free port, to have the goods shipped to their destination or through bill of lading; or shipped to the free port on option bill of lading which allows the merchant to defer his choice or settlement of the destination of goods until they have arrived at the free port. Merchants may also forward goods from domestic or foreign points to the free port for storage, and afterwards order them reshipped to any domestic or foreign point.

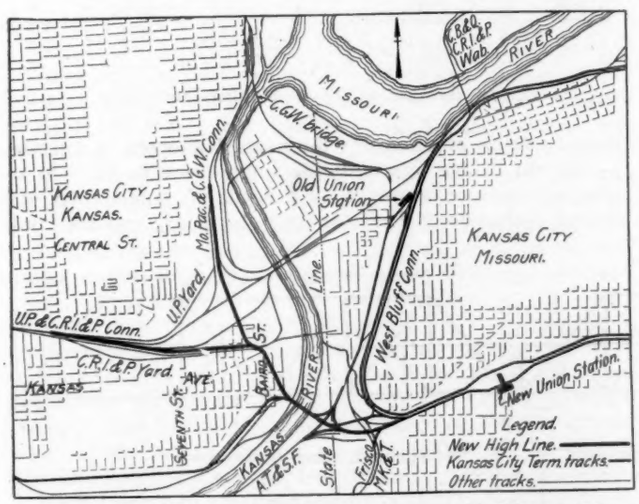


Completing the West 300-ft. Span.

Elevated Terminal Connection at Kansas City

Project Involves a Long Two-Track Steel Viaduct and a Heavy Double-Deck Bridge of Unique Design

THE KANSAS CITY TERMINAL RAILWAY is expending about $4,500,000 in constructing an approach to the Union station for the use of certain railways entering the city from the west which involves a double track elevated railway several miles in length across the bottoms of the Kansas river in Kansas City, Mo., and Kansas City, Kan., It also includes a double-deck railway bridge over the Kansas river, a project alone of no ordinary proportions which embodies a number of novel features of design and construc-



Location of the New Elevated Line Across the Kansas River Bottoms

tion. This is the latest important step in the Kansas City Union station project. The work has been in progress since October, 1916, and its completion in 1918 will effect a marked improvement in the facilities for both freight and passenger traffic in the district immediately west of the station.

The Union station project at Kansas City was brought about by the congested condition of the approaches to the old station, as well as by the inadequacy of the station facilities. Because of this fact the selection of a site for the new station at a distance of more than a mile from the old one left a number of the railroads without adequate means of access. Consequently the conclusion of the agreement between the several roads was largely contingent upon the formulation of satisfactory plans for adequate approaches to the station for all of the roads concerned. These plans embodied the West Bluff connection for the Chicago, Burlington & Quincy, the Wabash and the Chicago, Rock Island & Pacific, Chicago line, extending south from the Hannibal bridge past the old Union depot. It also provided for the reduction of grades and the four-tracking of the main line of the Kansas City Belt Railway to afford ample approach from the east for the Chicago & Alton, the Missouri Pacific, the Atchison, Topeka & Santa Fe, the Rock Island's St. Louis line, the St. Louis-San Francisco and the Kansas City Southern. A third provision was for an elevated railway to afford approach over the industrial district occupying the bottoms on both sides of the Kansas river between the bluffs of Kansas City, Mo., and Kansas City, Kan., for the trains of the Union Pacific, the Chicago Great Western, the Nebraska and northern Kansas lines of the Missouri Pacific, and the western lines of the Chicago, Rock Island & Pacific which enter Kansas City over the Union Pacific tracks.

The first two improvements were carried on simultaneously with the construction of the station but the building of this elevated railway or "High Line" was delayed. Consequently when the new station was opened the four railroads were compelled to seek temporary entrance to the station until such time as the approaches agreed upon would be ready. The Union Pacific and the Rock Island have been entering the new station via the tracks of the Kansas City Terminal from the Kansas side of the Kansas river, crossing that stream near the Santa Fe's western connection. The Missouri Pacific and the Chicago Great Western, which uses the tracks of the former from Leavenworth, Kan., now enter the station from Kansas City, Kan., by a route that crosses the Kansas river near its mouth, skirts the bank of the Missouri

river for about a mile and joins the tracks of the Kansas City Terminal near the site of the old Union station.

Both of these routes are subject to serious interference from freight, transfer and switching movements. The route of the first two roads is most seriously congested at the Kansas river bridge on account of a heavy movement of refrigerator cars to and from the packing houses on the Kansas side. Further interference in this route is caused by 15 railroad crossings and 4 crossings of important streets at grade in Kansas City, Kan. The second route interferes with switching in the industrial district along the Missouri river and with the operation of freight yards of the Santa Fe, the Burlington, the Alton and the Frisco in the vicinity of the old station.

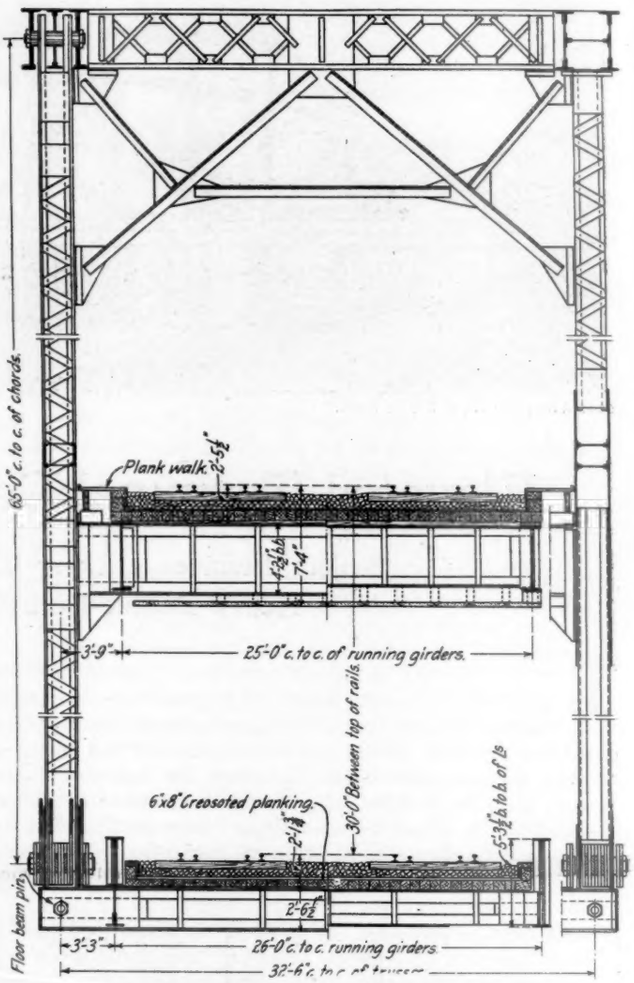
New Connection Eliminates Interference

The new "High Line" leaves the grade of the west station approach tracks about one-half mile west of the station, crosses the Kansas river on the site of the existing bridge and curves to the northwest to a point north of Kansas avenue where the structure divides, one branch for the Union Pacific and Rock Island turning to the west and the other continuing to the north to a connection with the Missouri Pacific tracks near Central avenue. The total length of this elevated railway is about 4 miles. Each of the branches is about 1½ miles long. It consists of 3,900 ft. of surface tracks, 8,800 ft. of embankment approaches, 8,500 ft. of steel viaducts and the bridge across the Kansas river, which in addition to providing a double track crossing for the elevated railway provides two tracks on a lower level for freight and switching movements.

The construction of this connection was delayed for a number of years in the negotiations for a franchise for the overhead street crossings in Kansas City, Kan., the primary difficulty being a difference of opinion as to the character of passenger station facilities to be provided by the railroads for that city. This feature was finally agreed upon and the plan which was approved by the people of Kansas City, Kan., in July, 1915, includes provision for two passenger stations to cost $100,000 each, in addition to the elevated railway. One of these stations will be located on the Union Pacific branch at Seventh street and the other on the Missouri Pacific branch at Central avenue.

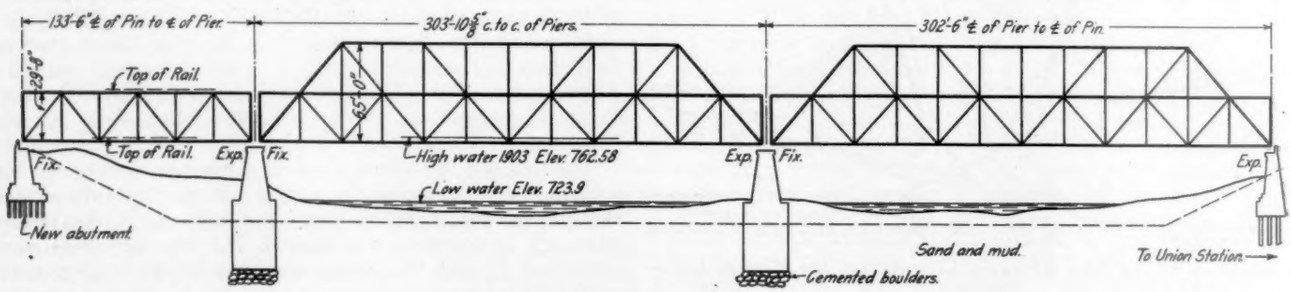
The Kansas River Bridge

The bridge over the Kansas river is the most important single feature of the project and is distinctive in a number of features. It is a double-deck structure. The heavy loading which this implies on two spans of 300 ft. each required the use of a number of special details of design. As in the old bridge, a preponderance of refrigerator car movements calls for the use of a water tight floor and the design of this was complicated seriously by the necessity for shallow construction on account of the unfortunate relation of high water in the river to the elevation of the tracks on the lower level. Because there are about 180 train movements over this bridge each 24 hr. it was imperative to devise erection methods which would insure absolute continuity of traffic over the bridge and at the same time avoid the use of the track on the bridge for any of the erection operations. As a result of these exacting requirements the method adopted is unusual.



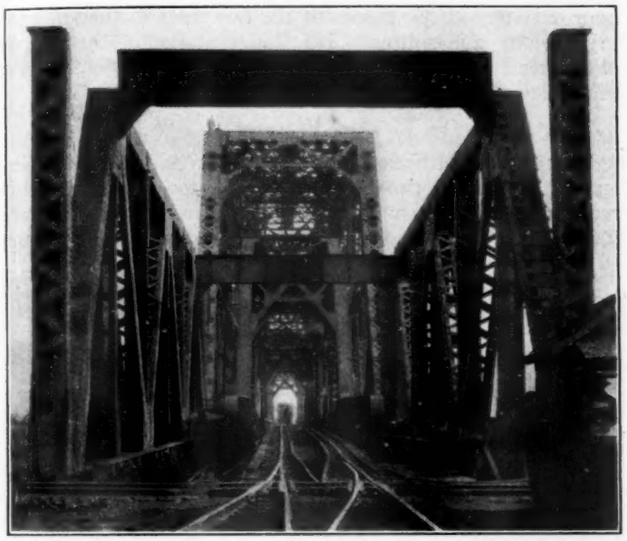
Cross Section of 300-ft. Double-Deck Span

The old bridge was built for single track in 1907 to replace a structure destroyed by a flood. A single track was entirely adequate at that time since the bridge was used only for transfer and switching traffic. It consists of two pin connected Petit through truss spans 300 ft. long with an 80-ft. through girder span and 50 ft. of pile trestle on the west end. A timber ballast floor on a suspended floor system carries the track. Of the substructure for the old bridge, the two piers and the south abutment are used to support the



Profile of the Kansas River Bridge

new superstructure. These had been built to provide ultimately for double track. The two piers were carried to a cemented bowlder formation by the pneumatic process and the abutment is supported on a pile foundation. The decision to make use of the old masonry was based on a careful study which took into account the heavier loading to be obtained from the double-deck structure. It was necessary



New 132-ft. Span in Foreground with Old 80-ft. Girder Span Still in Place

to provide a new west abutment which is carried on a pile foundation.

In the new structure the old 300-ft. spans are replaced by spans of the same length consisting of pin connected Baltimore trusses of sufficient height to provide a through structure for the traffic on both levels. The girder span is replaced by a 132-ft. riveted Warren truss span of such a height that it is a through structure for the lower level tracks and a deck span for the upper level.

Because of the heavy loading the truss members in the two 300-ft. spans assumed proportions ordinarily to be found in spans of much greater length. Each of the spans weighs nearly 2,300 tons. The bottom chord and one set of the main diagonals are eye-bars of nickel steel with a required ultimate strength of 95,000 to 110,000 lb. per sq. in. and an elastic limit of 55,000 lb. All other web members are of a box- or I-sections made of the ordinary structural grade of steel. The top chords and the end posts are of an H-section similar to that used in the main members of the Metropolis bridge. They have two heavy girder sections for the sides connected by a diaphragm in the plane of the chords, and double plate lacing and channel battens on the top and bottom faces. The material in top chords and end posts is a high carbon steel similar to that used in the ribs of the Hell Gate arch and has an ultimate strength of 66,000 to 76,000 lb. per sq. in. and an elastic limit of 38,000 lb. per sq. in.

Ballast floors are provided for both decks. The thickness of the lower floor from top of rail to under clearance was limited to 4 ft. 10⅞ in., while that of the upper floor, which was not so limited, has a thickness of 7 ft. 4 in. However, the same general scheme of floor framing was used in each case. The main floor beams, spanning from truss to truss at the panel points, carry girders spanning longitudinally just inside the trusses on each side. These in turn carry intermediate floor beams 5 ft. center to center on which are supported the timbers of the ballast flooring. In the upper floor the depth is such that this system entails no departure from ordinary structural practice. The main floor beams are attached to the posts of the trusses with the usual bracket connections, lateral stiffness of the spans being obtained by these connections and heavy portal and sway bracing above the upper roadway.

In the lower deck the main floor beams could be made only 2 ft. 6½ in. deep, back to back of angles, making it necessary to construct them as box girders. For this reason the longitudinal girders, which are 5 ft. 3½ in. deep, could not be framed into them to make the connection, so it was necessary to notch the ends of the longitudinal girders to rest on the top flanges of the main floor beam. A departure from usual practice in the connection of the lower floor beams to the trusses was devised to avoid bending in the posts as a consequence of the material deflection in floor beams of so shallow a depth. The bottoms of the posts were

New 300-ft. Span Surrounding Old Span, Showing Also Gantry Traveler and a Derrick Car on Temporary Track

extended below the main truss pins and were equipped with a steel casting containing a pin hole at right angles to the floor beam, thus affording a pin connection between the post and floor beam and thereby making the truss member independent of flexure in the floor system.

Erection Under Difficulty

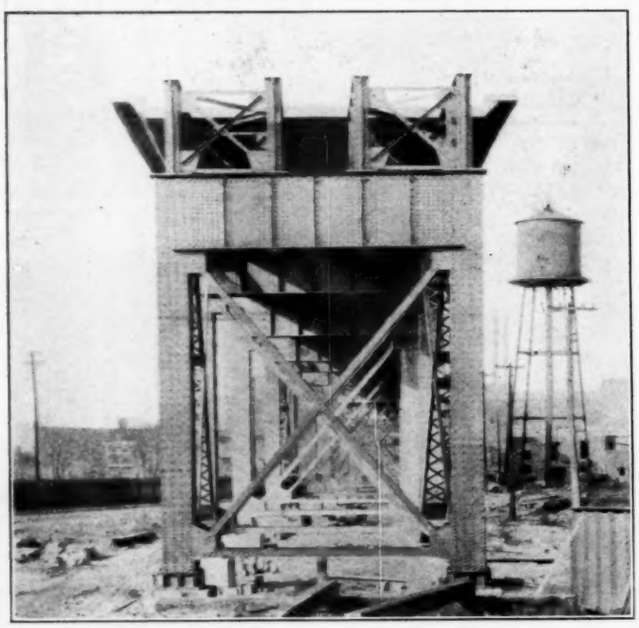
The greater width and height of the new spans naturally suggested their erection around the old bridge while the latter remained in service. The old superstructure had been erected on the south side of the substructure with a view to future renewal of the structure by a double track bridge. The erection plan adopted for the new structure in consequence entailed the shifting of the old superstructure nine feet to a central location in which its axis would coincide with the axis of the new bridge. This measure, however, would not

solve the problem of the erection of the new floor system for the lower deck, since the grade for the old track and that for the tracks on the lower level of the new bridge are identical. The piecemeal removal of the old floor system and its replacement by the new floor would be a slow and cumbersome process that would result in serious interference with the traffic. Another obstacle was the impracticability of driving piles for falsework in the space between the trusses of the old bridge since this would involve a disturbance of the ballast floor and interference with the heavy train movements.

The solution of these difficulties was attained by raising the old spans 27 in. so that the floor system for the new spans could be installed completely underneath the old floor before disturbing the old structure in any way. This plan has the further advantage that the old spans can be supported from the new and thus obviate the need of any falsework directly under the old span.

The erection method and falsework scheme are shown in several of the photographs. The space between the trusses of the new span was sufficient to permit the placing of the legs of the gantry traveler between the new and old trusses. The gantry is supported on rails carried on the top flanges of the two lines of longitudinal girders of the lower floor system.

The falsework consists of two bents of five piles each driven under each panel point of each truss of the new bridge. These bents are long enough to afford ample support for the new trusses, the girders carrying the gantry and also a temporary track outside the trusses on each side carried on girders intended for use in the upper floor system. These temporary tracks are used to deliver all structural materials to the work on flat cars and to support the derrick cars in erecting the lower floor system.



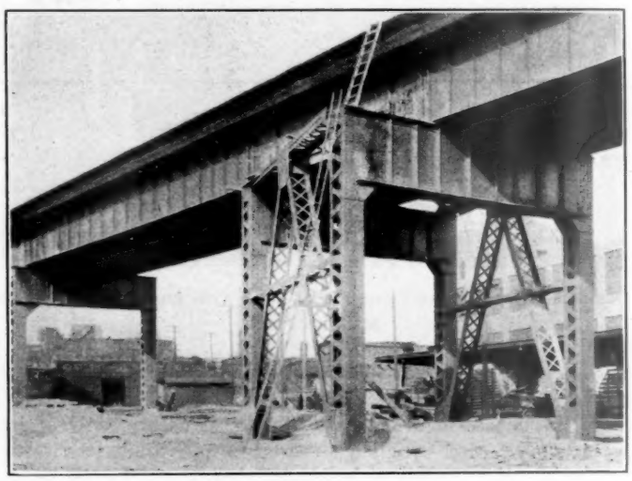
Typical Sectional View of the Viaduct

The method of erection with the gantry may be seen from the photograph. The two main cross beams at the top of the gantry have a material overhang beyond the trusses on each side and are fitted with rails on which a pair of heavy longitudinal beams spanning between the cross members may be rolled transversely. The longitudinal beams are equipped with heavy tackle for lifting and are shifted transversely as found necessary for the raising of members from cars on the tracks alongside and for placing them in position in the trusses.

One of the photographs shows an end view of the partly completed viaduct and indicates the character of the construction. The bents consist of two vertical columns generally 20 ft. center to center, connected by a cross girder, a bottom tie and cross bracing. These carry four lines of longitudinal girders covered by a reinforced concrete slab for ballasted tracks. The columns are of a built up H-section and the cross girders of a box section, the two webs being approximately in the planes of the two sides of the columns to facilitate web splices. The flange angles of the girders also extend beyond the webs for riveted connections to the column.

The Viaduct

Longitudinal stiffness of the structure is provided at intervals by bracing two bents to form a tower. Where this could not be done on account of interference with surface tracks, streets, etc., masonry piers were introduced consisting either of solid shafts or two pedestals connected by an arch. Another variation from the standard construction was used where the viaduct crosses a freight house and team yard at Baird street. To provide clear passage for tracks and roadways, the transverse bracing was omitted and the longitudinal bracing for the towers was arranged to form an "A" rather than an "X" to give a minimum interference.



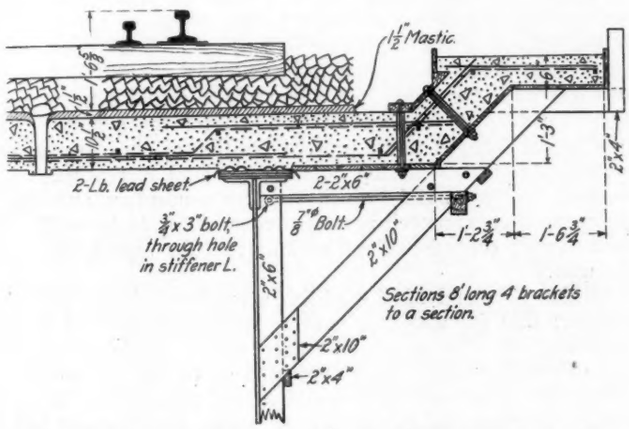
Special Tower Bracing Was Used Over a Team Yard

The viaduct columns are carried on creosoted pile foundations with pedestals varying from 6 ft. square to 12 ft. square depending on the load and the allowable pile bearing as determined by pile driving records. The concrete deck is 10½ in. thick, and cantilevers out on each side for a walk with outside edges 9 ft. 3 in. from the center line of track. The slab was built in place to give monolithic construction but has a longitudinal joint on the center line between the tracks and a transverse joint at intervals of about 100 ft. It is covered with waterproofing consisting of four-ply felt and one ply of cotton drill laid down with asphalt and covered with a one-inch asphalt mastic. The slab is pitched from the walk and from a ridge at the center line between tracks to drain holes at intervals of 5 ft. on the center lines of track. One interesting feature in connection with this floor slab is the protection given to the top flanges of the girder where covered by the slab. This surface is treated with a coat of refined coal tar and then covered with a sheet of lead weighing 2 lb. per sq. ft. which is carefully pressed down over the rivet heads. The concreting of the slabs was materially cheapened by the use of an ingenious form system suspended from the steel work as shown in a drawing.

On the Missouri Pacific branch of the viaduct three truss spans, 147 ft., 117 ft. and 137 ft. in length respectively

span a yard of the Union Pacific. These are riveted Pratt truss spans of the usual construction except that a floor of special construction is used on the northernmost span on account of the reduced headroom resulting from the descending grade of the tracks.

The embankments used in the three approaches to the viaduct contain 290,000 cu. yd. of material and were given two different forms according to the local conditions. Where space was available fills were built, having a 1¾ to 1 slope on each side with toe walls where the fill would encroach on streets or private property. These retaining walls are of a gravity broken-back type which has been used extensively on Kansas City Terminal work. Where but a limited amount of space could be used for the approach embankment, particularly where located between



Part Section of Viaduct Floor Slab Showing Form for Overhang

adjoining tracks, the embankment is supported between reinforced concrete walls 2 ft. thick, spaced 30 ft. apart and tied together at intervals of 14 to 16 ft. by concrete ties. These concrete ties were used to support the construction track required to place the filling material. The fill is all clay and will be planted with alfalfa on all exposed slopes.

Special mention is due the conduct of the engineering work for this structure. In the face of a rapidly advancing steel market it became imperative to award contracts for the structural steel for the entire viaduct, including the Kansas river bridge, as soon as the stage of work on the design, would reasonably allow, and was followed with the preparation of detail plans for the bridge companies at the rate of about 3,000 tons a month. This program entailed the perfection of an efficient organization and conduct of the work along systematic lines. Special measures were taken to insure accuracy of the field work. A standardized tape was procured from Washington and careful checks were made between the tapes used in the field and those used in the actual fabrication of the members.

This work was under the direction of J. V. Hanna, chief engineer, and G. E. Tebbetts, bridge engineer of the Kansas City Terminal. The general contractor for the entire project is the Arkansas Bridge Company of Kansas City, Mo. The steel work was fabricated by the American Bridge Company at the Gary plant, and is being erected by the Kelly Atkinson Construction Company, Chicago.

THE AUSTRIAN LOCOMOTIVE INDUSTRY IN 1917 delivered 398 locomotives and 326 tenders for Austrian State and private railways, but exported nothing. The car works delivered about 14,000 trucks and coaches to the state and private railways and to private industry.—*Commerce Reports.*

Rules for Handling Freight for the War Department

NEW INSTRUCTIONS AND REGULATIONS governing the shipment of freight for account of the War Department, which take the place of the old system of preference orders which were issued by the various government departments and which resulted in so much confusion, have been issued by the Car Service Section of the Railroad Administration and by H. M. Adams, director of inland transportation of the war department.

The instructions by W. C. Kendall, manager of the Car Service section, were issued in Circular No. C. S. 3 and order that beginning March 1 the shipment of carload freight for account of the War Department be handled only in accordance with the regulations of the division of inland transportation.

The director of inland transportation has issued Order No. 1, general rules and regulations for the government of contractors and bureaus in shipping freight for the use of the war department, and Order No. 2, regulations for the shipment of freight for particular destinations and provisions for a system of transportation orders.

The circular of the Car Service Section provides:

It will be noted that under the provisions of Order No. 1, all negotiations conducted by the war department with respect to embargoes, special movement, failure to furnish cars, tracing and delivery of cars, etc., will be conducted by the Division of Inland Transportation with carriers through the Car Service Section.

Carriers affected by the restrictions in Order No. 2, section 1, or reissues thereof, should cover these restrictions by embargo, or by special instructions to agents and others interested, on their respective lines.

It will not be necessary to transmit such embargoes to zone chairmen or to connecting lines.

Carriers laying embargoes against points not designated in Order No. 2, or against points included in subsequent orders from the Director of Inland Transportation, will exempt freight for account of the war department, in accordance with Circular No. C. S. 1, dated February 11, 1918, or reissues thereof.

Where such general exemption is not made, carriers must honor all Transportation orders issued by the Director of Inland Transportation, except when the freight covered by such orders is of a perishable nature, and the route to destination is impassable by reason of physical obstructions.

Agents must in all cases endorse original and all copies of bills of lading, and waybills (including card bills if issued) with a reference to the transportation order in the following form:

TRANSPORTATION ORDER
No. U. S. W. D. .....

Agents honoring transportation orders will require the surrender of such orders when presented, filing them with station copies of bills of lading.

In cases of emergency, transportation orders will be issued by telegraph over the signature of the Director of Inland Transportation. These telegraphic transportation orders will be addressed to the shipper or railroad agent at point of origin and will give the number of the order with all necessary details. They will be confirmed by mail. Such telegraphic orders should be honored and the telegrams held by the agent until the supporting orders are received.

Failure of the shipper to make use of transportation orders after they have been presented to carrier's agent, or failure to comply with the instructions governing their use, should be covered by full report to the Car Service Section.

In the event that connecting carriers refuse to accept ship-

ments moving under transportation orders, immediate report should be made to the car service section, giving full information, including order number, point of origin, destination, and the nature of the shipment.

These instructions supersede all previous instructions with respect to the handling of freight for use of the war department.

Report on Shepherdsville Collision

THE INTERSTATE COMMERCE COMMISSION has issued a report, dated January 28, and signed by H. W. Belnap, chief of the Bureau of Safety, giving the cause and nature of the rear collision of passenger trains on the Louisville & Nashville at Shepherdsville, Ky., on December 20, when 45 passengers and two employees were killed and 52 passengers were injured. This collision was reported in our issues of December 28, page 1,185; January 4, page 88, January 11, page 137, and January 18, page 181.

This report gives the facts substantially as they have been reported, but with a number of additional details. It is estimated that train No. 7, at the moment of collision, was running at 25 miles an hour. The force of the collision drove the standing train (No. 41) forward a distance of 800 ft. The conductor and the flagman of this train, who were killed, were standing on the front platform of the rear car. The line approaching Shepherdsville from the north is level for a distance of 2,100 ft. and is straight for 8,400 ft. In this distance there is nothing to obstruct the view of the engineman of an approaching train. The hour was about 5:30 p. m., it was dark, but the weather was clear. Shepherdsville station is on the west side of the tracks and the passing siding, on which the local train was to be set back, extends 400 ft. south of the station and about 2,500 ft. north. This track is between the two main tracks. The train-order signal is a semaphore, operating in two positions in the lower right-hand quadrant. The station agent and others testified that the red lights on the rear of train 41 were burning brightly. Testimony as to the speed of the express train, as to whether smoke, or fog or anything obscured the lights, whether or not train No. 7 whistled and as to how long No. 41 had been at the station, is somewhat confusing and the report makes no attempt to clear up all of the discrepancies.

Engineman Wolfenberger, of No. 7, said that it did not occur to him that not getting the signal at Shepherdsville was due to train 41 being close ahead, although he knew that he left Louisville 18 minutes behind it; he had been losing time himself. The fireman was on his seat but did not say anything to Wolfenberger about the signal.

The report makes no mention of the statement, reported to have been made by Wolfenberger at the investigation which was held by the Kentucky State Railroad Commission, to the effect that operators often change the train order signal, from stop to proceed, before the engineman calls for it, and that consequently enginemen were accustomed to accept a stationary signal (contrary to the rule requiring them to see the signal change from stop to proceed).

The fireman of train 7 said that all of the train order signals encountered between Louisville and Shepherdsville were given promptly. He had no conversation with the engineman about the position of the signal at Shepherdsville as they were approaching it; the rules do not require the engineman and fireman to call signals to one another.

The conclusion of the inspector is that the direct cause of the collision was the failure of the conductor and flagman of train 41 properly to protect their train. "The action of these two experienced employees in failing to protect their train is inexcusable." (According to the officers of the road, an important element in the negligence of these men was their failure to use fusees or torpedoes when losing time; but the present report does not say, in detail, in what the failure consisted.) Engineman Wolfenberger's neglect is called a "material contributing cause"; and to the officers of the road is attributed "a large measure of responsibility"; this for "failure to provide proper means of spacing trains in this territory." Continuing, the report says:

"Between South Louisville and Lebanon Junction, which territory embraces the scene of this accident, there are 44 scheduled trains in both directions daily. Traffic of such density can not be safely handled under the rules and practices of the time-interval system. For the prevention of similar accidents the operating officers should take immediate steps to provide an adequate block system.

"Rules 221*a* and 221*d* which assume to provide means for the proper spacing of trains in this territory, are grossly inadequate, if not positively unworkable. Rule 221*a* requires that when an approaching train has reached a point 600 feet from the signal, 'or nearer if the signal can not be seen that far,' the engineman will call for the signal, and if it is not changed to the proceed position at once the train must be brought to a stop before the signal is reached, as required by rule 221*d* [which requires conductors and enginemen when approaching train-order offices to have their trains under control and not assume that the signal will be changed.]

"Rules 221*a* and 221*d* establish a maximum braking distance of 600 ft., which is entirely inadequate for the safe movement of high-speed passenger trains. The schedule rate of speed of train No. 7 between Brooks and Shepherdsville is 50 miles per hour, and had the signal been in its normal position the engineman of train No. 7 could not have stopped short of the signal without having reduced speed very materially at a point considerably farther away than 600 ft. In short, compliance with this rule means that, irrespective of their schedules, trains must approach all open train-order offices prepared to stop within a distance of 600 ft. . . .

"The Louisville & Nashville Railroad in its annual reports to the Interstate Commerce Commission has repeatedly stated that this section of the road from Louisville to Bardstown Junction was operated under manual-block rules. It is clearly disclosed by this investigation, however, that such protection is not afforded, and furthermore it is evident that such protection was not intended to be given. Several witnesses stated that it was the practice to space trains 10 minutes apart. This is provided for in rule 91 of the general rules for movement of trains, and there is no rule among those providing for train movement under the manual block which permits this method of operating trains. It is therefore apparent that the manual block system is not in force on this portion of road, notwithstanding the Louisville & Nashville Railroad Company's reports to that effect.

"During the past five years about 700 miles of the Louisville & Nashville have been protected by automatic block signals, most of which mileage is on single-track road. According to its reports for 1916, 132 miles of road are worked under the manual block system. With 4,700 miles of road operated, this gives about 20 per cent of its passenger mileage protected by some form of space interval, and of its principal main lines about 45 per cent is so protected. While this shows commendable progress, the fact remains that there are still long sections of its main lines carrying heavy traffic without adequate protection. . . ."

BUY WAR SAVINGS STAMPS and turn them into War Savings Certificates and you will not only help to win the war but invest your money wisely.

Causes of the Decline in Railroad Credit

A Letter to the Interstate Commerce Commission by the Controller of the Currency

THE FOLLOWING LETTER, outlining the history of the conditions which caused the decline in railroad credit and a serious shrinkage in the market prices of railroad securities during 1917, was addressed to the Interstate Commerce Commission on November 1, by John Skelton Williams, controller of the currency and a former railroad executive, who is now also director of the divisions of finance and of purchases of the United States railroad administration. The letter was written just before the opening of the hearings before the commission on the application of the eastern railroads for advances in freight rates and gives the reasons which, in the opinion of the writer, demonstrated the insufficiency of the existing level of rates. It also gives an interesting view of the financial condition of the railroads just before the decision was reached that they should be taken over by the government. Mr. Williams said:

The official reports made to this office by the national banks of the United States show that these banks are the holders of about $500,000,000 of railroad bonds, largely of high character, selected with care and discrimination during a period of years. In addition to these large holdings the state banks, savings banks and trust companies hold approximately $1,500,000,000 additional of railroad securities.

Demoralization of Credit

These investments the banks purchased in the belief that they would maintain the prices at which they were purchased, or grow more valuable from year to year, with the growth and development of the country's business and of the corporations issuing them. A crisis, however, has arisen. The net earnings of many of our most important railroad systems, as well as of the less important lines, despite the greater volume of business, show a shrinkage which not only imperils dividends, but is threatening the ability of many railroads to meet their interest charges, and their solvency. There has been a serious collapse in the market values of railway securities and such a demoralization of credit that the sale of new securities to provide fresh capital or to meet maturing bonds has been shut off, and even temporary financing is now only being obtained at rates which are costly if not ruinous.

The impairment of confidence and consequent shrinkage in securities owned by the national banks had become so pronounced that on October 15, 1917, as controller of the currency I gave to the press a statement which said, in part:

"In view of all conditions, the controller of the currency has instructed national bank examiners that they need not at this time require national banks holding high grade bonds of unquestioned intrinsic value and merit to charge such investments down to present abnormal figures; but an intelligent and conservative discretion will be exercised as to the prices at which national banks can safely and reasonably be permitted to carry such high class securities, and as to what proportion of the depreciation should be charged off in any six months' period."

In giving out that statement I did so in the confident belief that the credit and welfare of the railroads of this country would be safeguarded and protected and that they would be permitted to charge such rates for the transportation of freight and passengers as would, with honest and efficient management, enable them to meet their expenses and yield a fair return upon the billions of dollars of capital which has been invested in them, and I am, of course, still confident that this will be done.

This office has received so many earnest requests asking the controller of the currency, in behalf of the national banks of the country, to make to your honorable commission representations as to the serious consequences which may ensue if relief is not promptly afforded the railroads in the shape of increased rates, to enable the roads to meet the unprecedented increases in the cost of materials and labor and yet maintain their credit, that I ask the liberty of submitting to you this memorandum and brief summing-up of the situation as I see it at this time, in the light of an experience of about 20 years as a railway executive (as well as banker) before retiring entirely from these activities and divesting myself of all financial interest in railroads and in banks, as I did, to accept public office more than four years ago.

As an illustration of the communications which have come to me as controller of the currency from banks which are under the supervision of this office, I beg leave to quote the following extract received under date of October 29, 1917, from the president of the First National Bank of ———, who says in part:

"Why does not the controller appear before the Interstate Commerce Commission and make an appeal for the banks of which he is supposed to be the guardian and protector? With millions of our funds invested in railroad securities, it would seem this would be his duty. . . . With the farmers granted over double prices, the coal, steel and copper double and more, the railroads are certainly entitled to a paltry 15 per cent."

With this apology I trust that I may be pardoned for respectfully submitting to your honorable commission this communication, based, as above stated, upon my own knowledge and observation of past and present conditions.

From the close of the Civil War up to the beginning of the present century the principal media for investment of the surplus earnings of the American people, in the way of public securities of any kind, were the bonds and shares of our railroad corporations. The railroad mileage of the country grew from 52,922 miles in 1870 to 192,940 miles in 1900, an increase of nearly four-fold; this new construction was paid for partly from the savings of our own people and partly from capital sent in from Europe.

Confidence in railway securities as investments was rudely shaken between 1892 and 1897, during which years 213 railways having an aggregate mileage of 56,402 miles, failed and passed into the hands of receivers. The total railway mileage of the country in 1892 was 171,563 miles—in 1897, 183,284 miles, so that the companies which became bankrupt *in those five years* represented nearly one-third of the entire railway mileage of the country. This is exclusive of many thousands of miles which had already become insolvent before 1892 and were in receivers' hands at the beginning of that five-year period.

The records show that the persistent and steady decline in railroad freight rates which had been going on through several decades culminated in 1898-9, but this shrinkage did not cease until the solvency of over one-half of the entire railroad mileage of the country, which had been built up to that time, had been destroyed.

The average rate, which in 1888 was 10.01 mills per ton

per mile, declined in 1890 to 9.41 mills. By 1895 it had fallen to 9.39 mills, and the low point was reached in the fiscal year 1898-9, when the average rate per ton per mile was only 7.24 mills. But although the shippers got this reduction of 25 per cent in the freight rate and also a reduction in the same period of 18 per cent in the average passenger mile rate, along with these reductions came the bankruptcy of companies operating tens of thousands of miles of railroad lines. In those years, it is fair to point out, the Interstate Commerce Commission did not possess the control over railroad rates which has since then been conferred upon it by Congress. With the powers now exercised by the commission such disastrous rate wars as were sometimes waged in the past by rival roads to ruin one another and which brought much demoralization, we are happy to realize, are no longer possible.

The Trend of Railway Rates

It is a long lane that has no turning. Finally the turn came, and a slight upward trend in ton-mile rates began in 1899. Contemporaneously with this upward movement came the revival in the general business of the country.

In 1901 the average rate per ton mile was 7.50 mills, and these rates did not again go below 7.48 mills until 1912, when the downward dip again manifested itself and an average rate of 7.41 mills was established. In 1913 the rate declined still further to 7.29, with a general business depression. In 1914 there was in the first half of the year a slight improvement in general business and the average rate moved slightly up to 7.33 mills. In 1915 the average rate was 7.32 mills. This rate of 7.32 mills was very close to the minimum rate established in 1898-9 of 7.24 mills, when over one-third of our railroad mileage had been turned over to receivers. At that time (1898-9), however, the cost of materials and labor was very much less than in recent years. Now, on top of unsatisfactory and inadequate freight rates, come enormous increases in the cost of both materials and wages, and the situation has again become perilous.

The following figures show the comparative stability of railroad rates after the minimum of 7.24 mills had been reached in 1899, and a 7.50 mill rate established in the fiscal year 1900-1:

1901	7.50 mills	1905	7.66 mills
1902	7.57 mills	1906	7.48 mills
1903	7.63 mills	1907	7.59 mills
1904	7.80 mills	1908	7.54 mills

With the rapid development of the country and prosperous and tremendously expanding business of those years, there was a pronounced revival of interest in railway securities, which rose to a very high level, and there were carried out in those years the successful reorganizations of many of the important trunk lines which had passed through receiverships in the five years prior to 1898. These reorganized properties included such well known systems as the Atchison, Topeka & Santa Fe, the Baltimore & Ohio, the Union Pacific, the Norfolk & Western, and many others.

Between 1898 and 1907, 42,807 miles of new railroads were added to the country's mileage—but this was 13,596 miles less than the mileage which had become bankrupt in the five years prior to 1898.

The financial panic of 1907 was followed by several years of more or less uncertainty and there were ups and downs in business without any great variations in railroad rates, until the outbreak of the European War in 1914. The swollen business of the country incident to the European war in 1916 brought large earnings to the railroads, which reached their maximum, both as to gross and net, in that year.

The Decline in Security Prices

The year 1917 has been a period of unprecedented advances in the prices of products and commodities of all kinds accompanied by heavy declines in the market values of bonds and stocks generally, but especially of railway securities. Some moderate advances in rates have been granted to railroads in some sections in the past 12 months, it is true, but the advances thus far allowed do not begin to offset the enormous increases which have taken place in the prices of materials and in wages.

The apprehension and fear that the railroads of the country may not be allowed to charge rates which will adequately offset the heavy increases in wages and in all materials which they use in operation, is in a large measure responsible for the shrinkage which has taken place in the railway security market in the past year.

To the inability of the railroads during the past 10 years to charge rates commensurate with the increases which have taken place during this period in wages and other operating costs is attributable a portion, but not the whole, of the enormous shrinkages in railroad values which have taken place in this longer period.

The table shows vividly the unprecedented declines in the market value of their shares which have been sustained by 12 of the leading railroad systems of the country from the highest prices reached in 1905 and later to the low prices prevailing *at this time*. These 12 systems include railroads in every portion of the country, north, east, south and west, and their gross earnings amounted for the year 1916 approximately 1,400 million dollars, or about 40 per cent of the total earnings of all the railroads of the coun-

TABLE SHOWING THE SHRINKAGE IN THE SHARES OF THE COMMON CAPITAL STOCK OF THE PARENT COMPANIES OF TWELVE LEADING RAILROAD SYSTEMS FROM THE HIGH PRICES IN 1906 OR LATER TO THE PRESENT LOW LEVEL.

	Outstanding capital stock (common)	Highest price since 1906	Value on basis of present capitalization and highest prices reached	Recent lowest sales	Value on basis of present low prices	Percentage* of shrinkage to capital stock	Shrinkage shown by multiplying given decline by present capitalization
Chic. Mil. & St. Paul	$117,000,000	199⅝	$233,561,000	43	$50,310,000	156⅜	$183,251,000
Baltimore & Ohio	152,000,000	122¼	185,820,000	50	76,000,000	72¼	109,820,000
Delaware & Hudson	42,000,000	227½	95,550,000	95	39,900,000	132½	55,650,000
Erie	112,000,000	50⅞	56,980,000	15⅛	16,940,000	35¾	40,040,000
Illinois Central	109,000,000	172	187,480,000	97¼	106,003,000	74¾	81,477,000
N. Y. Cent. & Hudson River	249,000,000	147	366,030,000	68	169,320,000	79	196,710,000
N. Y., N. H. & Hartford	157,000,000	204⅞	321,653,000	21½	33,755,000	183¾	287,898,000
Norfolk & Western	118,000,000	147⅛	173,608,000	101	119,180,000	46⅛	54,428,000
Pennsylvania	499,000,000	151¼	754,738,000	95½	476,545,000	55¾	278,193,000
Southern	120,000,000	42⅞	51,450,000	23	27,600,000	19⅞	23,850,000
Southern Pacific	272,000,000	138¼	376,040,000	82	223,040,000	56¼	153,000,000
Union Pacific	222,000,000	219	486,180,000	114¼	253,635,000	104¾	232,545,000
Total	$2,169,000,000		$3,289,090,000		$1,592,228,000	78.23	$1,696,862,000

Note: Percentage of shrinkage to value on basis of present capitalization and highest prices reached 51.59 per cent.

*What is meant by this is evidently the difference between highest price and lowest price: In other words the figure in the fourth column is subtracted from the figure in the second column to get the figure in the sixth column.—[EDITOR.]

try. Their mileage represents over 80,000 miles, or more than 30 per cent of the total railroad mileage of the United States.

The table only gives the declines that are shown in the market value of the shares of *common stock* of the *parent companies* of the 12 systems, and does not express the great losses that have been experienced in the preferred shares and in the bonds of the parent companies, or in the stocks or the bonds of the many subsidiary or auxiliary companies which are embraced in the mileage of those systems. The shrinkage in these has also been enormous.

From this table it is shown that the capital stock of these 12 parent companies is	$2,169,000,000
The market value of these stocks at the respective high prices for the period named aggregated	3,289,090,000
Their market value at the recent low levels of prices is only	1,592,128,000
This means that there has been a total shrinkage in values of 51.50 per cent, the total shrinkage in these 12 stocks being	1,696,862,000

This collapse in prices has wiped out, in this brief period, values, in the aggregate, nearly as great as the entire capital and surplus of all the national banks of the United States. Such a destruction or elimination of values, existing or supposed to exist, is well calculated to produce a profound and far reaching effect. This vast loss or shrinkage also represented a sum greater than the total net operating income of all the railroads of the United States for any two years combined prior to 1916.

Besides the direct losses inflicted upon individual investors and holders of railway bonds and shares, there must be taken into account the indirect losses suffered by the men and women who are stockholders in corporations of many kinds which hold railway securities among their investments, such as the insurance companies (both mutual and joint stock), savings banks, trust companies, national and state banks.

The total outstanding capitalization of the railroad corporations of this country at this time, which is now imperilled (including stocks, bonds and other obligations) is close to $18,000,000,000.

It is noteworthy that while railroad shares are now in many instances at the lowest prices at which they have ever sold, the shares of many industrial corporations are still selling at prices above the highest quotations which prevailed for them at any time prior to the outbreak of the European war.

The Necessity for Relief

Unless the roads are now enabled to secure substantial relief through an increase in rates, we will probably have a repetition of the experiences of 1892-7, when hundreds of railroad companies, operating about a third of the entire mileage of the country, including trunk lines and independent roads, were handed over, insolvent, to the management of receivers. The ton-mile rate is now close to the minimum rate of that period, although the roads are now compelled to pay from 50 *per cent* to 150 *per cent* more for wages and salaries, and for *every* material and article used by them in their operations. The enormously increased carrying capacity of the roads per car and per train, and efficient and scientific methods of management do not begin, as it is easy to demonstrate, to be sufficient to offset the big increases in wages, in taxes, and in the prices of materials which the railroads are now obliged to meet.

Within the past few days the announcement has been made of a large increase (45 cents per ton) in the price of coal in a large section of the country, to enable operators to meet an increase in wages to the miners. Many roads which a year ago were paying from 85 cents to $1.10 per ton for their coal, are now obliged to pay from $2 to $2.45 or more. An advance of a dollar a ton on the 200 million tons used by the railroads means an increased annual expense of 200 million dollars. The railroads *need an increase* in rates to enable them to meet the great increase in wages and materials, *far more than do the coal operators* who had already gotten an increase in the rates they are allowed to charge for coal of over 50 per cent.

For the fiscal year 1916 the freight rate per ton per mile was unofficially reported to have been 7.14 mills. This is, in fact, *lower than ever before recorded;* the previous minimum having been reached in 1898-9—7.24 mills, and at the end of the calendar year 1916 we had 34,622 miles of railroad, embracing 70 railroad corporations representing every section of the country, administered by receivers. The mileage of these insolvent roads ranged from a few miles up to the Rock Island System with 7,653 miles. Among the lines in the hands of receivers were nine systems of over 1,000 miles each, namely, the Boston & Maine, 2,398 miles; the Chicago & Eastern Illinois, 1,136 miles; the Chicago, Rock Island & Pacific, 7,653 miles; the International & Great Northern, 1,160 miles; the Missouri, Kansas & Texas, 3,536 miles; the Missouri Pacific, 3,931 miles; the St. Louis, Iron Mountain & Southern, 3,555 miles; the Pere Marquette, 2,249 miles, and the Texas Pacific, 1,944 miles.

Your honorable commission in the past has shown itself to be the best friend of the railroads, as well as the protector of the public, and one cannot look back to the old days of cut-throat competition among the railroads, or remember the gross discriminations in rates in times past when the railroads used their rate-making and rate-cutting powers to make fortunes for favored shippers and to ruin others, without appreciating the enormous power for good which your commission has so beneficently exercised; nor should we fail to remember the time when certain leading trunk lines not only gave special low rates to certain monopolies or trusts, but also granted to those monopolies a bonus for every ton of freight hauled by them for the competitors of the 'trust.'

Fair-minded and well-informed men have admired the firmness with which this honorable commission has resisted the pressure so often brought to bear upon it in divers ways by selfish interests, and the force and clearness with which it has presented the sound reasons for the conclusions which it has reached. Right thinking men have also deplored the unjust and malicious criticisms that your honorable body has been required to endure in the just and fearless performance of its duties.

When the railroads shall have laid before you frankly the facts and figures to show to what extent the rates now in force are insufficient to maintain the credit of the roads and to enable them to perform efficiently their public functions, under the present unusual and extraordinary conditions, we are entirely confident that the decision which you may reach will be one which your superior knowledge and painstaking study of the whole situation will amply justify; but I trust that I may be pardoned for expressing the earnest hope that this decision, whatever it may be, will come promptly.

The construction of new railroad lines has now practically ceased, and existing roads have been forced to shut down largely on their improvement and betterment work. Unless a way can be found now to reduce the prices of materials and the cost of labor to a normal basis, and this for the present is hopeless, it seems clear, on the facts as they now appear, that revision and modification of the fabric of rates to meet these new conditions has become imperative.

If this is not done, I fear we may look forward to defaults in dividends and in interest, and to another era of railroad receiverships, with all the evils, destruction of credit and demoralization which that implies. If the relief required is granted, confidence in our railroad securities will be revived and a basis established for new financiering and

for proceeding with new development and construction work which is now so greatly needed. The beneficent influence and effect of such action would be felt throughout our entire country.

Mr. Williams also discussed the subject in his recent annual report in part as follows:

Depression in Railway Securities Owned by Banks

For more than half a century most of the surplus earnings of the people of the United States available for the purchase of public securities have been invested in the bonds and shares of our transportation corporations, principally steam railroads and electric street railways. The rates these corporations are allowed to charge for transportation of passengers and freight are closely limited—for steam railroads by both the Interstate Commerce Commission and the state corporation commissions of the respective states; for the street railways by municipal and other local authorities. The average freight and passenger rates permitted to our railroads in the past year were about 30 per cent under the average rates of 30 years ago; while the wages paid, in many instances, have increased 100 per cent, and the cost of materials used for operation also has increased as to numerous articles 100 per cent, and in some cases much more than 100 per cent.

In the fiscal year ending June 30, 1916, the railroad corporations of the country, despite low rates, made the greatest earnings in their history, both gross and net, owing to the great increase in the volume of traffic. It became evident, however, that with the tremendous advances in wages and in the cost of materials between July, 1916, and December, 1917, the railroads would be unable hereafter to approximate the net earnings realized in the last year or two, without a material increase of the rates for transportation they are allowed to charge, and that many of them lacking such increase, or some other relief, would be unable to meet their fixed charges and maintain solvency. The uncertainty on the part of investors as to whether the Interstate Commerce Commission would grant the relief the figures seemed to show to be needed was asserted—and apparently with reason—to have caused heavy declines in the quoted prices of nearly all railroad securities. The shares of some of our most important transportation lines and "arteries of commerce" have recently fallen to the lowest level in the past quarter of a century.

There are faithful students of the situation who think it is as important rightfully to protect for honest investors the value of the securities of legitimate enterprises and to save them from ruin as to restrain the prices charged the people for what they eat and wear and use to keep their homes habitable. The investors and holders of securities representing the corporate business enterprises of the country may be few in numbers, comparatively, but the effect of disaster or ruin to them spreads widely and threatens the stability of our entire economic and financial system, impairs ability to absorb future loans needed by the government, and checks hope of development.

FUEL PRICES IN HOLLAND.—The Netherlands Government has fixed maximum prices for coal and coke, taking effect January 1, which are an advance on previous prices. They are stated in florins per hectoliter, but in American terms are equivalent to about $22 a ton for anthracite, and $17 for bituminous coal; coke, about $10 a ton; coal briquets, about $25 a ton. The distribution is carefully regulated by cards in specified quantities, varying with the size and nature of the residence or the place of business. The quantity allowed, especially to residences, is much smaller than the amount they consumed in peace times.—*Commerce Reports.*

Gigantic Construction Program of American Engineers in France*

THE STUPENDOUS CHARACTER of the construction program undertaken by the American railway engineers in France is outlined in a letter received by G. D. Hood, superintendent of telegraph of the Chicago, Rock Island & Pacific, from Mel Printz, master engineer, Third Engineers' First Battalion, National Army. The letter reads in part as follows:

"With the arrival of more and more material, and more men skilled in railway and terminal construction, the 'port to front' American railway is developing on a large scale, so that thousands of troops will be handled and an endless supply of ammunition and food kept going every day. American engineering genius is having its chance to show on French soil what it has done at home and, after the war, France will have a splendid American line to help reconstruction.

"Aside from the high officers of army headquarters, the transportation experts gathered by General Pershing from the army engineers and from civil life, few Americans have the slightest idea of the size of the project. Few, in fact, realize that the problem placed before the transportation service of the A. E. F. is so important that until it is solved and the solution put into concrete form—in rails and ties, in cars and locomotives, in wharves and warehouses—until that time the army itself, as an important factor on the battlefield, must remain imperceptible.

"There is a long stretch from the available harbors of the French coast to the American troops near the front. Somehow this territory must be traversed by speeding trains, carrying men and munitions, food and clothing, building materials, and all the other goods, animate or inanimate, which must be delivered from the transport harbors to the front. This must be done without disturbing for an instant, the traffic on the many French lines in military use.

"The main route from the harbor of ——? to the American front has been in existence for years. It sufficed for handling the peace-time traffic of that part of France. When a small freighter arrived, it was unloaded, chiefly by hand. Its cargo was put ashore and ultimately removed in small lots by the tiny French freight cars. From there on, distribution inland was conducted much after the fashion of the 'local freight work' in America.

"This is a matter of technical construction not merely of yard tracks, but of wharves and warehouses, giant cranes, dredges, everything which would be needed, say, for the creation of a new harbor within the Jersey meadows leading to rail connection at Newark.

"At one of the chosen harbors, ten new wharves are to be built. On them are to be installed mechanical unloading devices—as an example, the army has ordered sixty of the largest loading cranes. The old terminal system suited to the light traffic of French peace times is to be swept out almost bodily. It was possible to run small cars in on direct stub tracks, receive them on turntables, slide to another stub track and send them out. The big American cars cannot be handled that way; so instead, the engineers will put in the loop system providing for a continuous flood of empty cars passing into the wharves system and out loaded.

"As cars will not be always immediately available, and as it is vital that the ships be unloaded and returned without delay to America, there are to be giant storage sheds for holding the freight until new rolling stock arrives. Every bit of this work is pioneer work, in a strange land, with

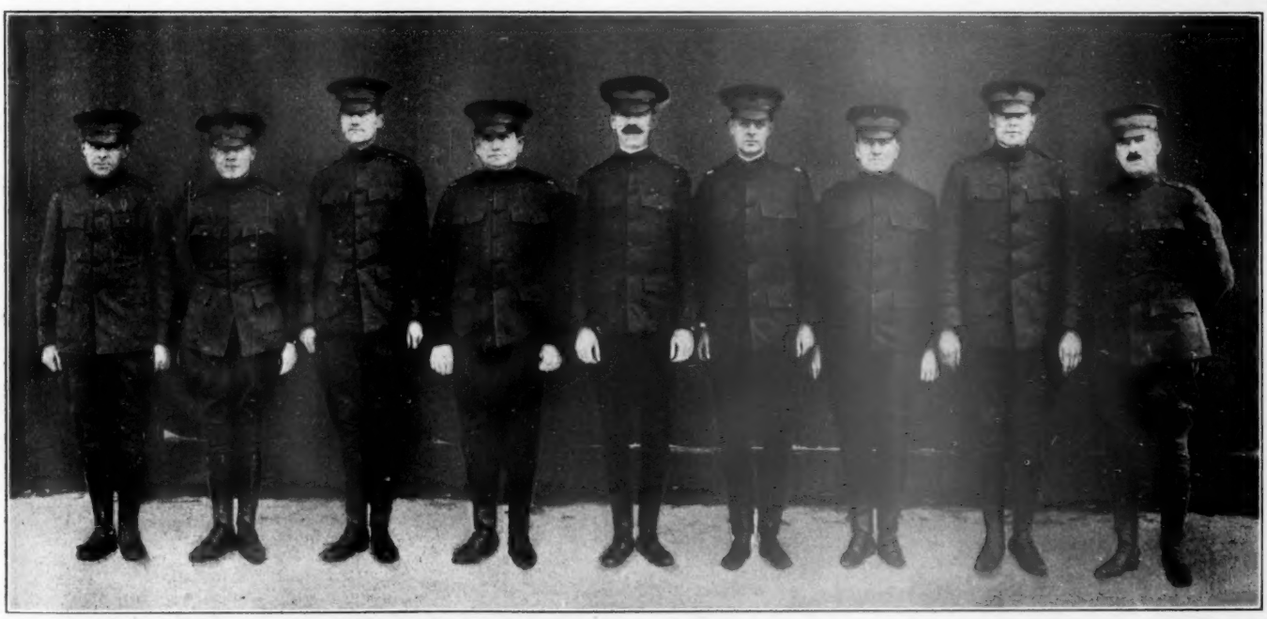
*The *Railway Age* expects to publish regularly letters from railwaymen overseas. If you receive a good letter from a railwayman who is now in France send it in for publication and let the *Railway Age* pass it around for all to enjoy.

labor almost non-existent. Even the great route must be enlarged with sidings. The prevalent French system of despatching at half hour intervals must be replaced with a quick service allowing, in emergency, trains at five times that frequency. Here is employed the remarkable brain of the American train despatcher, brought to France by the U. S. government, for that purpose.

"And at the end of the express route are the light field railways within the area where it is not advisable to build permanent tracks. Here are the narrow-gage tracks and rolling stock and motive power built today, destroyed tomorrow, rebuilt the next day and working, as nearly as possible, all the time. And from this net-work must be built a still finer net-work of highways where motor trucks will take over the goods and distribute them to advanced points in the fighting area itself. This is no job of building park boulevards."

The 413th Telegraph Battalion

ONE OF THE MOST INTERESTING of the special military units which have been raised in this country for service abroad is the 413th Telegraph Battalion, Signal Corps, National Army. This battalion, which is composed entirely of volunteers and numbers 230 men, is an organization of railroad telegraphers. The work of drilling, training and thoroughly equipping the men has just been completed, and the battalion is now housed in its barracks in France ready for actual service in the field.



The Officers of the 413th Telegraph Battalion

From left to right—Lieut. R. J. Hunter, supply officer; Lieut. D. S. Bixler, adjutant; Lieut. J. H. Pinter; Captain J. B. Crosley; Major C. G. Baird; Captain J. D. Jones; Lieut. J. G. Dennis; Lieut. E. K. McCloskey; Lieut. A. A. Lawton, medical officer.

All but one of the officers, and a majority of the enlisted men, of the 413th Telegraph Battalion are employees of the Pennsylvania Railroad, furloughed from their usual duties to devote their specialized skill and experience to the military service of the nation as long as may be required. They consist of division operators, train despatchers, block signal operators, telegraph operators, electricians, linemen and other railroad men of allied occupations.

The battalion has been recruited in the last three months by its commanding officer, Major Charles G. Baird, who has been for seven years division operator of the Pennsylvania Railroad at New York and has been altogether 20 years in the company's service.

The duties of the battalion, which will probably take its members frequently into and near the front-line trenches, will be to construct and maintain telegraph lines of communication for the American Expeditionary forces abroad.

Major Baird's experience in the railroad service has particularly fitted him to direct and supervise work of this kind. When the New York passenger station of the Pennsylvania Railroad and the tubes under the Hudson and East rivers were opened, he was placed in charge of the construction and installation of all the telegraph and telephone lines and other similar electrical work required. He also built the overland lines and equipped ten interlocking block stations, and then organized the operating forces, consisting of train despatchers, train directors, telegraph operators, signalmen, etc., and remained in charge of them until he assumed his military command. Major Baird is a veteran of the Spanish War, in which he distinguished himself for bravery under fire.

The adjutant of the battalion is Lieutenant D. S. Bixler, who was a Junior at Princeton University when war was declared, and volunteered for service, entering the military training corps at Princeton. He was then transferred to the Officers' Reserve Training Corps at Fort Myer, Virginia, and after completing that course was transferred to the Army Transportation Section and assigned to the 413th Telegraph Battalion, Signal Corps. He is an employee of the Pennsylvania Railroad, and was learning the railroad business by working through various departments during vacations. He is the son of H. C. Bixler, superintendent of stations and transfers of the Pennsylvania Railroad.

The medical officer of the battalion is Dr. A. A. Lawton, who has been commissioned first lieutenant. He was a prominent physician in New York City.

The supply officer is Lieutenant R. G. Hunter, who was Major Baird's chief assistant in the construction and installation of the telegraph and telephone systems of the Pennsylvania Railroad's New York improvement.

Company "D" of the Battalion is in command of Captain

J. D. Jones, an electrical engineer who was division operator of the Pennsylvania Railroad at Williamsport, Pa., when he volunteered. Prior to that he had been assistant division operator at Pittsburgh.

Company "E" is commanded by Captain J. B. Crossley, who was train despatcher on the New York, Philadelphia & Norfolk at Cape Charles, Va.

Lieutenant J. G. Dennis was a train despatcher of the Pennsylvania Railroad at Pittsburgh. Lieutenant J. H. Pinter was a telegraph operator of the railroad at New York. Lieutenant E. S. McCormick was a train despatcher on the Allegheny division. Lieutenant E. K. McCloskey was a telegraph operator in the railroad service at New York.

As a final step of preparation all of the members of the 413th Telegraph Battalion were furnished with comfort kits and other supplies by the Women's Division for War Relief of the Pennsylvania Railroad, an organization composed of wives and daughters of Pennsylvania Railroad employees who have made it their duty to look after the comfort of railroad men who have entered military service.

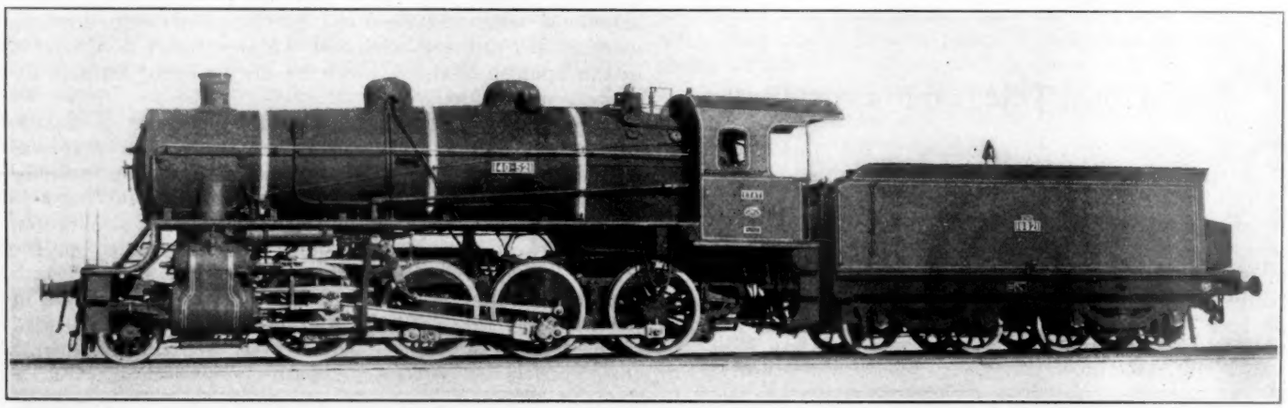
The medical officer of the battalion, Dr. Lawton, has been supplied with a complete hospital equipment, which was a gift to the battalion by the Pennsylvania Railroad.

A liberal supply of tobacco for all the boys in the battalion was delivered to the barracks shortly before departure. This was a gift from the Pennsylvania Railroad Employees Tobacco Fund, an organization of employees of the railroad who are endeavoring to keep their former associates, who are now in the army and navy, supplied with "smokes."

The Pennsylvania Railroad System now has more than 11,000 of its employees in the military and naval service of the United States. All of these have been furloughed from the railroad service, and upon their release from military duty will be returned to their old or equally good positions with the railroad.

Consolidation Type Locomotives for French Railways

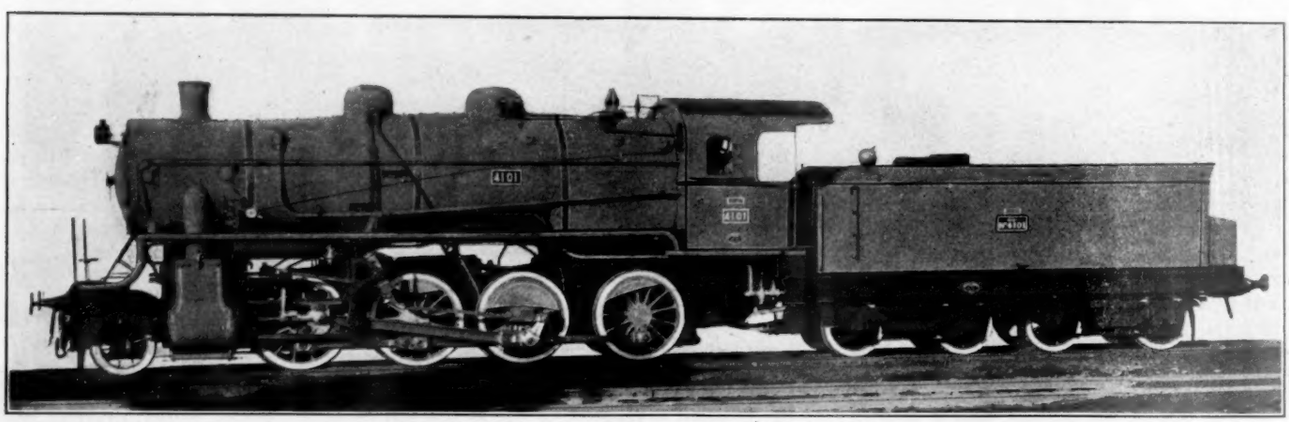
TWO ORDERS OF CONSOLIDATION TYPE LOCOMOTIVES, aggregating 140 locomotives, have recently been completed by the American Locomotive Company for France. The Chemin de Fer du Midi received 40 and the French State Railways 100 locomotives, the design being the same in both cases with the exception of the diameter of the driving wheels and some other minor differences.



The French State Railways Locomotive

The engines are of basic American design modified in fittings and fixtures to suit French practice. They were designed by the builder, and each drawing was approved by a representative of the railway. The dimensions are in the metric system, the International system of screw threads, and the French-Westinghouse system of pipe threads.

The locomotives all have cylinders 23 in. by 26 in., and carry 170.6 lb. boiler pressure. Owing to the slight difference in the diameter of the drivers there is a difference of 1,000 lb. in the tractive effort of the two orders, the locomotives for the French State Railway developing a tractive effort of 35,200 lb., while those for the Midi develop 36,200 lb. While the boiler capacity is low in



Consolidation Type Locomotive for the Chemin de Fer du Midi

relation to the cylinder capacity, it compares very favorably with recently built locomotives of the same type for use on American railroads.

The dimensions of both boilers are identical. The design in general follows American practice, a good grate area being obtained by the use of a short, wide firebox. The firebox is fitted with a brick arch and the boiler includes a 26-element superheater. Handholes are used instead of washout plugs to give greater accessibility for washing out. A dump grate in the front of the firebox is operated from the cab by a screw, the firedoor opens inside as required by a French law, and the outside end of the blowoff cock has a special thread for connection to the fire hydrants of the city of Paris. In order to quickly free the stack of smoke, the blower is fitted with a quick-opening valve operated from both sides of the cab. Lagging on the boiler is omitted; the jacket is supported on a crinoline frame leaving an air space which acts as a non-conductor.

Among the points of general interest in the design, it will be noted that the locomotives are all controlled from the left side, contrary to American practice. The steam is distributed by 10¼-in. piston valves, which are controlled by the Walschaert valve gear. The cylinders are fitted with by-pass valves operated by air cylinders, and with muffled cylinder cocks.

While the running gear in general is designed along the lines commonly followed in this country, the cross-balancing of the driving wheels is contrary to American practice for two-cylinder locomotives. The effect of this practice on the angularity of the counterbalances is clearly indicated in the illustrations.

A pneumatic sander is combined with a screw conveyor extending through the sandbox and operated from the cab.

All the engines have a variable exhaust operated from the cab by a screw which passes through one of the handrails, and the front ends are fitted with spark arresters. Other special types of equipment include French Westinghouse air brakes, French standard buffers and couplers, Roy buffers between engine and tender and a water brake.

The general dimensions and data for the two locomotives are given in the table:

General Data

	French State	Midi
Gage	4 ft. 8½ in.	
Service	Freight	
Fuel	Bit. coal	
Tractive effort	35,200 lb.	36,200 lb.
Weight in working order	160,000 lb.	159,500 lb.
Weight on drivers	139,000 lb.	138,500 lb.
Weight on leading truck	21,000 lb.	
Weight of engine and tender in working order	266,400 lb.	264,500 lb.
Wheel base, driving	16 ft. 9 in.	
Wheel base, total	24 ft. 11¼ in.	
Wheel base, engine and tender	53 ft. 3¼ in.	

Ratios

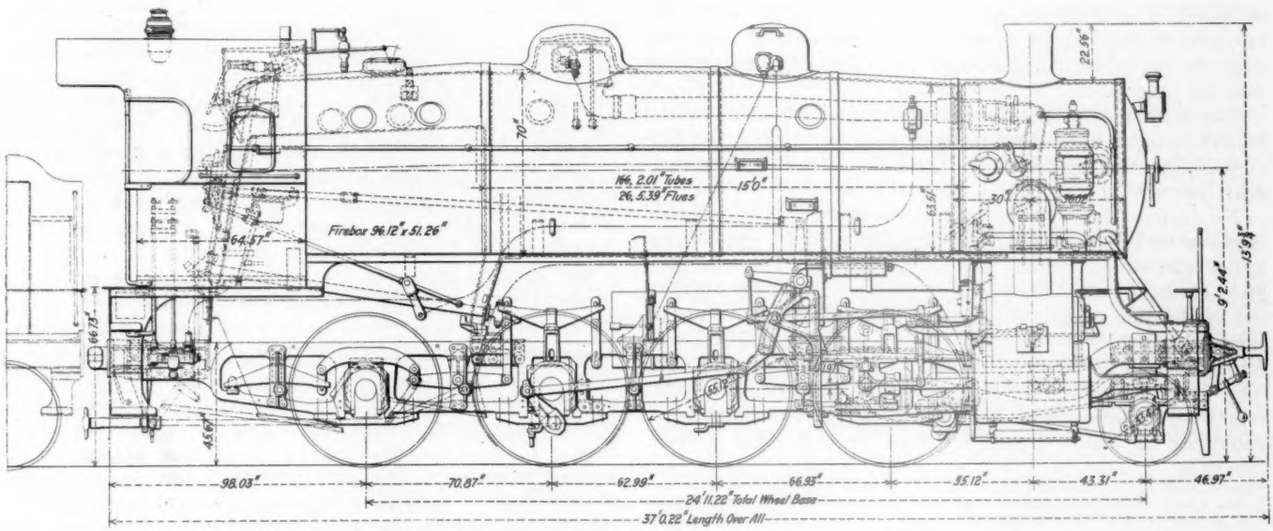
Weight on drivers ÷ tractive effort	4.0	3.9
Total weight ÷ tractive effort	4.6	4.4
Tractive effort × diam. drivers ÷ equivalent heating surface*	748.6	748.5
Equivalent heating surface* ÷ grate area	76.2	
Firebox heating surface ÷ equivalent heating surface,* per cent	5.3	
Weight on drivers ÷ equivalent heating surface*	52.1	52.0
Total weight ÷ equivalent heating surface*	60.0	59.8
Volume both cylinders	12.5 cu. ft.	
Equivalent heating surface* ÷ vol. cylinders	213.2	
Grate area ÷ vol. cylinders	2.7	

Cylinders

Kind	Simple
Diameter and stroke	23 in. by 26 in.

Valves

Kind	Piston
Diameter	10¼ in.
Greatest travel	6 in.
Outside lap	1 in.
Inside clearance	Line and line
Lead in full gear	¼ in.



Elevation of Consolidation Type Locomotive for the Chemin de Fer du Midi

Wheels

Driving, diameter over tires	56¾ in. 55⅛ in.
Driving, thickness of tires	2¾ in.
Driving journals, main, diameter and length	9 in. by 10 in.
Driving journals, others, diameter and length	8 in. by 10 in.
Engine truck wheels, diameter	33½ in.
Engine truck, journals	5½ in. by 10 in.

Boiler

Style	E. W. T.
Working pressure	170.6 lb. per sq. in.
Outside diameter of first ring	64⅝ in.
Firebox, length and width	96⅛ in. by 51¼ in.
Firebox plates, thickness	Crown, sides and back, ⅜ in.; tube, ½ in.
Firebox, water space	Sides and back, 3 in.; front, 4 in.
Tubes, number and outside diameter	166—2 in.
Flues, number and outside diameter	26—5⅜ in.
Tubes and flues, length	15 ft.
Heating surface, tubes and flues	1,840 sq. ft.
Heating surface, firebox	142 sq. ft.
Heating surface, total	1,982 sq. ft.
Superheater heating surface	456 sq. ft.
Equivalent heating surface*	2,666 sq. ft.
Grate area	34.2 sq. ft.

Tender

Tank	Water bottom
Frame	Channel
Weight	106,400 lb. 105,000 lb.
Wheels, diameter	37¾ in.
Journals, diameter and length	5⅛ in. by 9½ in.
Water capacity	4,756 gal.
Coal capacity	5 metric tons

*Equivalent heating surface = total evaporative heating surface + 1.5 times the superheating surface.

An Equation to Express Fair Return

By Wm. G. Raymond

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IN A LITTLE BOOK CALLED "What Is Fair" which has just been published, the author, who is also contributing this article, proposes an equation to express fair return to a public utility under continuous regulation from the beginning. In proposing the equation the author contents himself with saying that the application of the equation pays interest, which he calls the wage of money, on all capital whether represented by bonds or stock, and a profit rate for service that grows less as the business grows larger although the gross money profit grows with the growth of business; that the application of the expression is such that extension of business on a given capital is encouraged; that it indicates the profitableness of doing business with borrowed capital, and that public control must be exercised to see that operating costs are not inflated.

The equation is, Fair Return $= rI + 10rC^{7/8}$,

in which I is the invested capital, r the rate at which the corporation can borrow money, and C the annual operating expense, excluding fixed charges but including depreciation and all other items.

The author says that the coefficient and exponent of the second term of the second member may be subjects for discussion, but that he thinks the principle according with general commercial practice is sound.

No further discussion of the application of this equation is given and it is thought an illustration of its application under various conditions will be of interest. For this purpose Tables 1 and 2 herewith are presented. Table 1 shows the application of the formula for five different amounts of invested capital varying from $10,000 to $100,000,000 and for two ratios of invested capital to annual operating cost. The first, with the capital ¼ of the annual operating cost, represents in some degree the private competitive commercial enterprise in which capital is turned several times a year.

TABLE 1.—SHOWING THE APPLICATION OF THE FORMULA (FAIR RETURN = $rI + 10rC^{7/8}$) FOR TWO RATIOS OF CAPITAL TO ANNUAL OPERATING COSTS. WHEN r IS 5 PER CENT. (QUANTITIES CERTAIN TO FOUR SIGNIFICANT FIGURES ONLY.)

Capital	$10,000	$100,000	$1,000,000	$10,000,000	$100,000,000
Return:					
Wage of money 0.05 × Capital	500	5,000	50,000	500,000	5,000,000
When Capital Is One-Fourth of Annual Operating Cost					
Wage of service = profit	5,318	39,881	299,070	2,242,710	16,817,800
Total return	5,818	44,881	349,070	2,742,710	21,817,800
Per cent of capital.	58.18	44.88	34.91	27.43	21.82
When Capital Is Four Times Annual Operating Cost					
Wage of service = profit	470	3,525	26,434	198,231	1,486,525
Total return	970	8,525	76,434	698,231	6,486,525
Per cent of capital.	9.70	8.53	7.64	6.98	6.49

The second represents in some degree the case of the public utility, which generally has an invested capital much in excess of the annual operating costs. Indeed, in the case of electric lighting properties and rail properties it is probable that the capital is more often five times the annual operating cost than four times that cost which is assumed in the table. An interest rate of 5 per cent has been assumed for the table and it will be noted that in the application of the equation there is nothing to encourage the corporation to obtain its money at a low rate since the higher the rate it must pay, the higher its profit rate will be, and it may be that the two r's of the two terms should be different; the first representing what the company must pay, the second representing an acceptable going rate of interest. For the table the r's are taken as the same and as 5 per cent.

The table gives the total return that would be allowed under this formula, and the rate of return on the invested capital, which in the case of the private competitive commercial enterprise varies from about 58 per cent where the capital is small ($10,000) to about 22 per cent where the capital is large ($100,000,000). For the public utility the rate on the investment varies from 9.7 per cent where the capital is small ($10,000) to 6½ per cent where the capital is large ($100,000,000). Many thoroughly successful commercial enterprises are earning in accordance with the figures given and most public utilities would be entirely content to earn in accordance with the figures given for them if such earnings could be assured. And the earnings shown are certainly sufficiently less than those of the successful private commercial enterprises to satisfy the most conservative of those who feel that public utilities, being whole or partial monopolies, should be content with a less rate of return than is accorded private competitive business.

TABLE 2.—SHOWING THE RATE PER CENT OF RETURN TO THE OWNER FOR THREE RATIOS OF BORROWED CAPITAL AND OWNER'S INVESTMENT; OTHER ASSUMPTIONS AS IN TABLE 1.

	Capital = ¼ annual operating cost			Capital = 4 times annual operating cost		
Total capital invested	Nothing borrowed	½ borrowed	9/10 borrowed	Nothing borrowed	½ borrowed	9/10 borrowed
$10,000	58.18	111.36	536.8	9.70	14.40	52.00
100,000	44.88	84.76	403.8	8.53	12.05	40.25
1,000,000	34.91	64.81	304.1	7.64	10.28	31.43
10,000,000	27.43	49.85	229.3	6.98	8.96	24.82
100,000,000	21.82	38.64	173.2	6.49	7.97	19.87

But a study of Table 2 is perhaps even more interesting in showing the effect of doing business with borrowed capital. Purely private business is more often done on the capital of the owner than is the public utility business which is more often done with borrowed capital, and this fact tends to equalize the earnings of the two classes of business, such equalization being considered proper by the author of the book. It will be noted that for the private business where nothing is borrowed, the rate of return on the invested capital is only slightly more than the rate of return on the owner's invested capital in the public utility business in that case where the owner borrows 9/10 of his capital.

It should be noted also that rate of return is not always as important as the gross sum earned. Many public utilities have been financed wholly on borrowed capital, the stock representing nothing but speculative value, and where this is the case the rate of return is infinite on the capital invested by the owner. If the stock could be said to have some value, that attaching to the foresight and enterprise in establishing the property, then the rate would be finite, and if this value might be said to be 1/9 of the money capital invested, so that the whole capital might be said to be 10/9 of the actual money invested, the owner's return would be as in the last column of Table 2, which compares favorably with the return shown in the second column.

It is thought that a careful study of Tables 1 and 2 will be interesting and instructive to many persons who are studying the question of fair return.

IMPORTS TO THE UNITED STATES for the seven months of the fiscal year ended with January were valued at $1,634,000,000, as against $1,348,000,000 for the corresponding period of the previous year, according to figures just issued by the Department of Commerce. Exports for the seven months' period totaled $3,448,000,000, as compared with $3,616,000,000 for a similar period the year previous.

Railway Officers Wanted for Service Abroad

S. M. Felton, Director General of Military Railways, Organizing Additional Operating and Engineering Regiments

S. M. FELTON, director general of military railways, is organizing a number of additional railway regiments and battalions for active service in France and desires to hear from capable railway officers or ex-officers who desire to go abroad as commissioned officers. In addition to the regiments already abroad, two railway operating regiments of a total strength of 1,587 each, are now being organized, together with five railway operating battalions of a strength of 774 each, one railway maintenance of way battalion of a strength of 774 and two maintenance of equipment battalions with a strength of 774 each; and other units are to follow.

Mr. Felton desires to hear from officers and ex-officers who are or have been general managers, general superintendents, assistant superintendents, superintendents of transportation, division superintendents, superintendents of motive power, master mechanics, trainmasters, chief despatchers, general yardmasters, yardmasters, road foremen of engines, general shop foremen, engine house foremen, engineers of maintenance of way, roadmasters and track supervisors who desire to take active service in these railway units, providing they are not over 50 years of age in the case of general superintendents, superintendents of motive power and general managers, and not over 45 years of age in the case of officers of lower rank. In communicating with Mr. Felton at his office at 734 Fifteenth street, N. W., Washington, D. C., they should give their railroad experience in detail and their references. Men now in active service should have the consent of their superior officer before applying.

Providing the qualifications are satisfactory, commissions will be given for the various ranks as follows:

General managers, as lieutenant colonels;

Assistant general managers, general superintendents, and superintendents of motive power, as majors;

Division superintendents, master mechanics, engineers of maintenance of way, as captains;

Trainmasters, chief despatchers, road foremen of engines, general yardmasters, roadmasters, as first lieutenants;

Yardmasters, track supervisors, and engine house firemen as second lieutenants.

Enlisted Men

The office of the Chief of Engineers of the War Department has recently issued a booklet entitled "The United States Needs Skilled Engineers in France," describing the needs of the army for engineer troops, the duties of the various departments of the engineer service and the conditions of enlistment, for the purpose of giving information to men desiring to enlist as privates or non-commissioned officers and to the employers of such men. Some extracts from this booklet, including the sections particularly applicable to railway engineers, are as follows:

In this war, the duties of engineer troops are so varied that any man with technical training can be so placed that he may employ his training with advantage to his country and with pleasure and profit to himself.

Engineer troops are charged with reconnoitering and surveying for military purposes and the preparation of maps of the theater of operations; planning and superintending of defensive and offensive works of troops in the field; examination of routes of communications for supplies and for military movements; construction and repair of military roads, railroads, and bridges; military demolitions; the conduct of gas and flame warfare; the operation of "Tanks"; the location, design and construction of wharves, piers, landings, storehouses, hospitals and other structures of general interest; the construction, maintenance and repair of roads, ferries, bridges and incidental structures; and the construction, maintenance and operation of railroads under military control, including the construction and operation of armored trains.

The American army operating in Europe must be transported, fed, supplied with ammunition and all other materials and supplies required to conduct successful warfare. To render this possible the engineers must provide for the construction of wharves, warehouses, storehouses, shops, hospitals, depots and all of the other structures necessary to protect the army and its ammunition and supplies from the weather. It must build and operate railroads connecting the wharves with the storehouses and depots, and the latter with a point as close to the scene of fighting as may be practicable, with branch lines to every point where it may be necessary to supply the American forces.

Roads must be constructed and repaired, bridges built, repaired and strengthened, fortifications and other defensive works laid out and constructed. For these and other purposes, trees now standing in French forests must be felled and converted into railroad ties and timber.

All of this work falls to the part of the engineers, whose efforts are just as important toward the final success of our arms as are those of the men in the forefront of battle. The man building a road over which motor trucks rush bombs to the front is doing work just as important as the man who finally throws the bomb into the enemy trench. The railroad builder or trainman who facilitates the movement of supplies of food and ammunition to the front is performing just as essential a duty as the man on the firing line. So, too, is the carpenter who is engaged in construction of storehouses for supplies and ammunition, which are stored until needed for use of the fighting force.

The engineer department is not organizing a civilian construction and operating corps for service in France, and further addition to the overseas civilian clerical force has been stopped. It is proposed to have the engineer construction, clerical and operating work required by the American Expeditionary Forces performed by special engineer units organized as part of the United States Army. This rule will be observed save under very exceptional circumstances.

There are no civil positions in connection with the engineer units in the military service. All civil positions in the engineer department at large, except that of mere laborer, are made under civil service rules as required by law. The incumbents of these positions are not in the military service and are not sent abroad. Information relating to qualifying for these positions should be obtained by corresponding with the Civil Service Commission, Washington, D. C.

Approximately one-half of the organizations are strictly combatant, the others are special units made up of skilled men who, in peace time, are engaged on work similar to that which they are expected to perform with our armies abroad. All of these organizations, whether originally organized as combatant or special troops, will be assigned such duties as competent authority may direct, and will be available for all kinds of service. All organizations will be organized as military units with the various grades of officers and non-commissioned officers, and all men are uniformed and equipped as soldiers. The officers are taken

from the Corps of Engineers, the Engineer Officers Reserve Corps, from graduates of engineer training camps, and from enlisted men who have earned promotion to commissioned grades. The enlisted men are enlisted for the period of the emergency in the National Army authorized by the act of Congress approved May 18, 1917.

An enlisted man desiring to transfer to another unit must make an application therefor through military channels to the commander having authority to effect the transfer and stating the reasons for the request, also his qualifications for service in the particular regiment to which he asks transfer. Action on such requests will be governed by circumstances, and by the views expressed in the indorsements of commanding officers. The expense of a transfer made at the request of a soldier must be borne by the soldier.

Any registrant under the selective service law, who has not actually been called to service, may be immediately inducted into the service at the request of the registrant. Applications for induction should be made to the Chief of Engineers, giving a complete statement of the applicant's qualifications.

Any man who is physically qualified between the ages of 18 and 21, or 31 and 40, may voluntarily enlist for an engineer organization, provided he proves to the recruiting officer that he is experienced or skilled in any engineering trade, or is a "handy man" who is specially suited for engineering work.

Volunteers should apply to a recruiting officer, or to an engineer officer.

There are about 600 recruiting stations in the United States. An officer at any one of these stations will enlist you for an engineer organization, if you are deemed suitable.

Enlistment is in the grade of private. Subsequent promotion to the rank of non-commissioned officer is secured by merit. It is intended to fill many of the vacancies which will occur from time to time among the commissioned officers by selection from the ranks. One of the best ways to secure a commission is through enlistment.

The regulations governing physical requirements for enlistment in engineer organizations are the same as for the army at large, but minor defects in volunteers for some of the special units may be waived by proper authority.

After entering the service, men are clothed, fed, sheltered and transported at the expense of the United States.

Army pay, as shown below, is practically clear money:

MONTHLY PAY OF ENLISTED MEN

Rank	Pay in U. S.	Pay abroad
Master engineer, senior grade	$81.00	$96.00
Master engineer, junior grade	71.00	84.00
Regimental sergeant major	51.00	60.00
Battalion sergeant major	51.00	60.00
Regimental supply sergeant	51.00	60.00
Battalion supply sergeant	51.00	60.00
First sergeant	51.00	60.00
Sergeant, first class	51.00	60.00
Sergeant bugler	48.00	56.00
Mess sergeant	44.00	51.20
Supply sergeant	44.00	51.20
Stable sergeant	44.00	51.20
Color sergeant	44.00	51.20
Sergeant	44.00	51.20
Corporal	36.00	40.80
Horseshoer	38.00	44.00
Saddler	36.00	40.20
Wagoner	36.00	40.20
Cook	38.00	44.00
Bugler	30.00	33.00
Private, first class	33.00	36.00
Private	30.00	33.00

The act approved October 6, 1917, makes government allowances for the dependents of soldiers, in addition to the soldiers' pay.

Engineer troops are organized into sections, detachments, separate companies, separate battalions and regiments.

The organization of Sections and Detachments depends upon the character of the work for the section or the detachment.

An engineer company consists of the following enlisted men:

	No.
First sergeant	1
Sergeant, first class	4
Supply sergeant	1
Mess sergeant	1
Stable sergeant	1
Sergeant	10
Corporal	20
Horseshoer	1
Saddler	1
Wagoner	5
Cook	5
Bugler	2
Private, first class	66
Private	132
Total enlisted	250

A Separate Battalion consists of the following enlisted men:

	No.
Master engineer, senior grade	2
Master engineer, junior grade	4
Battalion sergeant major	1
Battalion supply sergeant	1
Sergeant	2
Corporal	2
Wagoner	2
Cook	1
Private, first class	3
Private	6

and *three* or *four* companies.

A Regiment consists of the following enlisted men:

	No.
Master engineer, senior grade	4
Master engineer, junior grade	4
Regimental sergeant major	1
Regimental supply sergeant	2
Sergeant bugler	1
Color sergeant	2
Sergeant	2
Wagoner	3
Cook	2
Private, first class	6
Private	12

and *six* companies, of two or more battalions.

Railway Construction Battalions

These battalions will construct or repair the railroads which will carry food and ammunition to the front; their duties will include grading, track construction and maintenance, bridge work, etc. When an advance is made, the tracks must at once follow the troops, so that the supply of munitions will not fail.

Volunteers are especially desired who are experienced

Timbermen;
Bridge carpenters;
Masons;
Pipe fitters;
Steam fitters;
Hoisting enginemen;
Firemen;
Dinky runners;
Teamsters;
Track layers;
Construction foremen;
Pile drivers;
Concrete foremen;
Telegraph linemen;
Riggers;
Machinists;
Blacksmiths;
Transitmen;
Surveyors;
Draftsmen;
Storekeepers;
Machine repairmen;
Clerks;
Electricians;
Oilers;
Painters;
Rock drillmen;
powdermen;
Signal installers;
Bridgemen;
Cooks.

Car Repair Shop Battalions

These organizations will be located in car repair shops and yards in France where repairs will be given to freight and passenger car equipment. Volunteers are desired who have had experience in railway and manufacturing car shops.

General foremen;
Shop foremen;
Gang leaders;
Office men;
Storekeepers;
Acetylene welders;
Airbrake repairmen;
Air tool repairmen;
Automobile repairmen;
Blacksmiths;
Buckers-up;
Car builders, wood and steel;
Derrick enginemen;
Electricians;
Flangers—steel shapes;
Gas enginemen;
Machinists;
Mechanics' helpers;
Painters;
Pipe fitters;
Planing mill men;
Roofers;
Sheet iron workers;
Tinsmiths;
Truck repairmen;
Upholsterers;
Buglers;
Barbers;
Cooks;
Tailors;
French interpreters.

Enginehouse Battalions

These organizations will be located at railroad terminals in France from entry ports to the fighting lines. They will maintain American and French type locomotives in service. Volunteers are desired who have had experience in railway enginehouses.

Clerks;
Draughtsmen;
Engine despatchers;
Enginehouse foremen;
Gang leaders;
Storekeepers;
Airbrake repairmen;
Airbrake inspectors;
Ashpit men;
Acetylene welders;
Boilermakers;
Boilerwashers;
Blacksmiths;
Car repairmen;
Carpenters;
Coal and sand storage men;
Electricians;
Engine watchmen;
Electrical welders;
Flue repairmen;
Hostlers;
Locomotive inspectors;
Laborers;
Messengers;
Machinists;
Oil room attendants;
Plumbers and Pipe fitters;
Stationary engineers;
Switchmen;
Staybolt inspectors;
Tinsmiths;
Tender repairmen.

Locomotive Repair Shop Battalions

These organizations will be located in locomotive repair shops in France where general repairs will be given to American and French type locomotives, including fire box and boiler renewals. Volunteers are desired who have had experience in railway shops as

Master mechanics;
Shop foremen;
Gang leaders;
Office men;
Storekeepers;
Acetylene welders;
Air tool repairmen;
Automobile repairmen;
Blacksmiths;
Boilermakers;
Carpenters;
Cab builders;
Cabinet makers;
Coppersmiths;
Crane operators;
Electricians;
Erecting shop machinists;
Gas enginemen;
Machine shop machinists;
Mechanics' helpers;
Painters;
Pipe fitters;
Stationary enginemen;
Sheet Iron workers;
Tender repairmen;
Truck repairmen;
Tinsmiths;
Buglers;
Barbers;
Cooks;
Tailors;
French interpreters.

Railway Maintenance of Way Battalions

These organizations will maintain the railroads in France. The men of the regiments will renew ties, repair worn rails and switches, in fact, everything which goes towards the maintenance of a railroad already built. Volunteers are desired who are, or have had experience as

Track laborers;
Section foremen;
Extra gang foremen;
Carpenters—Bridge and building
Track supervisors;
Carpenters—Foremen;
Signal supervisors;
Signal maintainers;
Signal batterymen.

Railway Miscellaneous Trades and Storekeepers Battalions

In order to supply the needs of the army at the front it is necessary to maintain and operate a high class, standard gage railroad.

The amount of traffic handled during a stated period of time is so vast that it requires a very efficient force of experienced railroad men to make the enterprise a success.

Railroad storehouses must be manned to handle this vast business and special men are needed for the work, as well as for other details of railway operation among them men of the following classes:

General storekeepers;
Auditors;
Stock men;
Accountants;
Bookkeepers;
Statisticians;
Stenographers;
Clerks;
Shipping clerks;
Machinists;
Carpenters;
Plumbers;
Electricians;
Freight handlers;
Station agents.

Railway Operating and Transportation Battalions

These organizations will operate railroads in France from the landing places to the fighting line. The men of the regiments will operate the trains and act as despatchers, station agents and operators, etc. Volunteers are desired who are, or have had experience as

Yard clerks;
Brakemen;
Switchmen;
Conductors;
Yard foremen;
Asst. yardmasters;
Yardmasters;
Locomotive firemen;
Locomotive engineers;
Telegraph operators;
Station agents;
Train despatchers;
Pile driver enginemen;
Locomotive inspectors;
Wreck derrick men;
Cooks.

Progress Toward Standardization

RAPID PROGRESS has been made by the committees of car and locomotive builders and of railroad mechanical officers in the preliminary work of preparing specifications and designs for various types of standard freight cars and locomotives to be reported to Director General McAdoo for his decision. When the standard types are finally adopted it is understood that they are to be used not only for the cars and locomotives to be purchased by the Railroad Administration out of the revolving fund consisting of an appropriation by Congress of $500,000,000 and any surplus earnings of the railroads above the amount required for their guarantee, but also for orders to be placed by individual roads which are able to finance additions to their rolling stock.

Greater progress has been made so far in the designs for standard freight cars than in those for the locomotives, both because of the greater degree of standardization which previously existed in the car field and also because some of the work done by the Committee on Standard Box Cars of the American Railway Assocation could be taken as a foundation. It is probable that the railroad officers and the builders will be able to agree on specifications for the cars to be submitted to Mr. McAdoo early next week.

As has been previously reported in the *Railway Age*, the Railroad Administration first requested suggestions for the proposed standards from the committees representng the car and locomotive builders, of which Samuel Vauclain, vice-president of the Baldwin Locomotive Works, is chairman. These were appointed by the Council of National Defense last summer at the time when the plan for having the government acquire from 100,000 to 150,000 cars for the use of the railroads was under serious consideration. These committees were called into conference by Henry Walters, chairman of the Atlantic Coast Line and the Louisville & Nashville, who is in charge of the standardization investigation for Director General McAdoo, and their recommendations for both cars and locomotives were then referred to a committee of railway mechanical officers, three appointed by each Regional Director, and H. T. Bentley, superintendent of motive power and machinery of the Chicago & North Western and mechanical assistant in the Transportation Division of the Railroad Administration, as chairman.

The designs submitted by the builders' committees have been gone over carefully by the railroad committee, which has made numerous suggestions for changes as to types, dimensions, weights, etc., and has asked the builders to make the desired changes in their designs. When the revised designs are approved by the railroad committee they will be submitted to Mr. Walters and Mr. McAdoo for final approval.

In addition to the members of the committee, as published in last week's issue, a number of others have been called into the conferences, including F. H. Clark, general superintendent of motive power of the Baltimore & Ohio; C. A. Schroyer, superintendent of the car department of the Chicago & North Western; H. R. Warnock, general superintendent of motive power of the Chicago, Milwaukee & St. Paul; J. C. Fritts, master car builder of the Delaware, Lackawanna & Western; A. G. Trumbull, assistant to the

general mechanical superintendent of the Erie; J. McMullen, mechanical superintendent of the car department of the Erie; W. O. Moody, mechanical engineer of the Illinois Central; John A. Pilcher, mechanical engineer, Norfolk & Western; W. J. Keisel, Jr., assistant mechanical engineer, Pennsylvania; F. W. Mahl, director of purchases of the Southern Pacific.

While the entire matter is still in a tentative stage and nothing will be definitely decided until the various recommendations are approved by Director General McAdoo, it is understood that the following types of cars have been under consideration: 40-ton single sheath box car, 40-ton double-sheath box car, 50-ton single-sheath box car, 50-ton all-steel gondola with light drop doors, 50-ton composite steel and wood gondola with light drop doors, 55-ton all-steel hopper bottom coal car, 70-ton all-steel hopper bottom coal car, and 70-ton low side gondola. The suggestions of the railroad committee were concurred in by the Vauclain committee and the necessary changes in design are being made this week, to be presented for approval at a meeting next week in Washington.

It is also understood that about 10 types of locomotives have been under consideration, for the first orders to be placed, including 6-wheel and 8-wheel switching locomotives, a heavy and a light Mikado, two Pacific types, two Mountain types and possibly a Mallet and a Santa Fe type.

The proposed Mikado, Pacific and Mountain types are as follows:

Type	Cylinders	Weight on drivers	Tractive power
Mikado	26 in. by 30 in.	220,000 lb.	54,600 lb.
Mikado	27 in. by 32 in.	240,000 lb.	60,000 lb.
Pacific	25 in. by 28 in.	165,000 lb.	40,700 lb.
Pacific	27 in. by 28 in.	180,000 lb.	43,800 lb.
Mountain	27 in. by 30 in.	240,000 lb.	57,000 lb.
Mountain	27 in. by 30 in.	220,000 lb.	53,900 lb.

Further conferences between the railroad committee and the locomotive builders are to be held next week at Philadelphia after the car designs have been approved.

Because of the greater variety of conditions encountered on western lines additional types will probably have to be considered before the work is completed as well as variations for the different kinds of coal used.

The question of patented specialties has been one of the most complicated that have had to be considered and the question of how they are to be dealt with has not yet been finally determined.

One of the questions under consideration has been as to how far it is desirable to go in standardizing various devices —whether the specifications shall extend to detail types or whether they shall be sufficiently elastic to admit of all types that can conform to standard dimensions in such a way as to permit of interchangeability. It is understood that the latter idea is most likely to prevail and that modern devices of proved merit will be approved, but those in the experimental stage will not be included. The locomotives are to be equipped, among other things, with superheaters, brick arches, mechanical grate shakers, mechanical fire-doors, and two water gages. It has not been decided to what railroads the locomotives will be assigned, but it is understood that where it is known that a considerable number, such as 50 to 60, are to be delivered to a road, that road may be allowed to indicate the particular specialties which it has been accustomed to use.

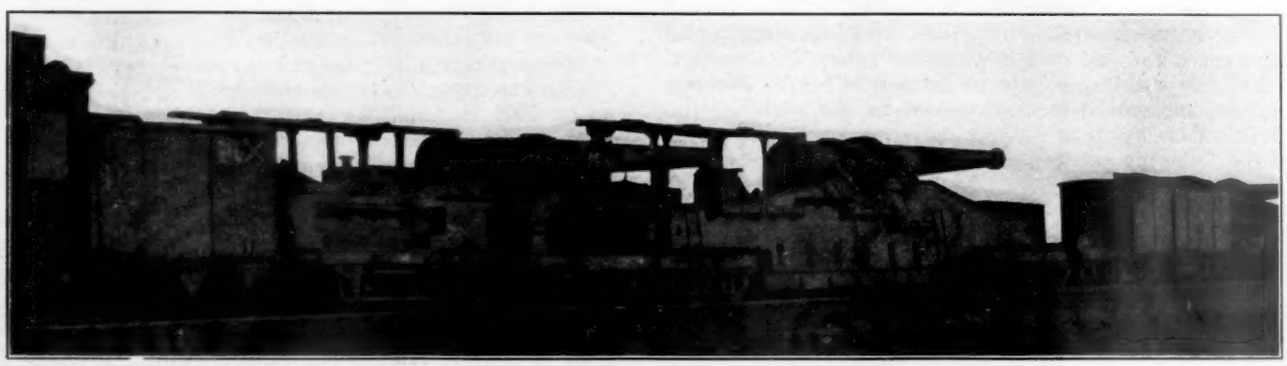
As to the cars, it is understood that friction draft gear conforming to standard specifications must be used and that spring draft gear will be excluded.

It is also understood that cast-steel bolsters and cast-steel side-frames will be used, if conditions in the steel market permit. Frictionless side-bearings probably will be given preference. It is understood that the M. C. B. journal boxes will be used. Brakebeams of three or four point suspension are favored. There is a report that the committee thinks roofs on which the patents have expired should be used.

The committees probably will not make public their recommendations until they have gone to Mr. McAdoo and been passed on by him, for until then nothing can be regarded as finally settled. Meantime, those who have been watching developments closely pretty well agree that the outcome will be a widespread distribution of orders among railway supply manufacturing concerns. In fact, the orders to be placed will be so large that only by a pretty widespread distribution of them will it be possible to get the specialties required made as rapidly as the conditions demand. There are some classes of concerns, such as the makers of spring draft gear, which apparently will be hard hit. The same will be true of concerns having devices that are just in the development stage.

There has been much speculation as to the number of cars and locomotives to be ordered by the government. The bill providing for an appropriation of $500,000,000 has been passed by both Houses of Congress and is in conference this week for the adjustment of provisions on which the bill was passed in different form by the Senate and the House. An order of 100,000 cars is most frequently mentioned in the gossip, but an order for 150,000 to 200,000 has been spoken of as possible and it is understood that the locomotive order will be for 1,500.

It is understood that the Railroad Administration will arrange for standard prices, which will apply to all orders, whether placed by the railroads or by the administration, and arrangements will be made whereby the builders will have priority orders for the materials needed so that the cars and locomotives may be delivered as rapidly as possible.



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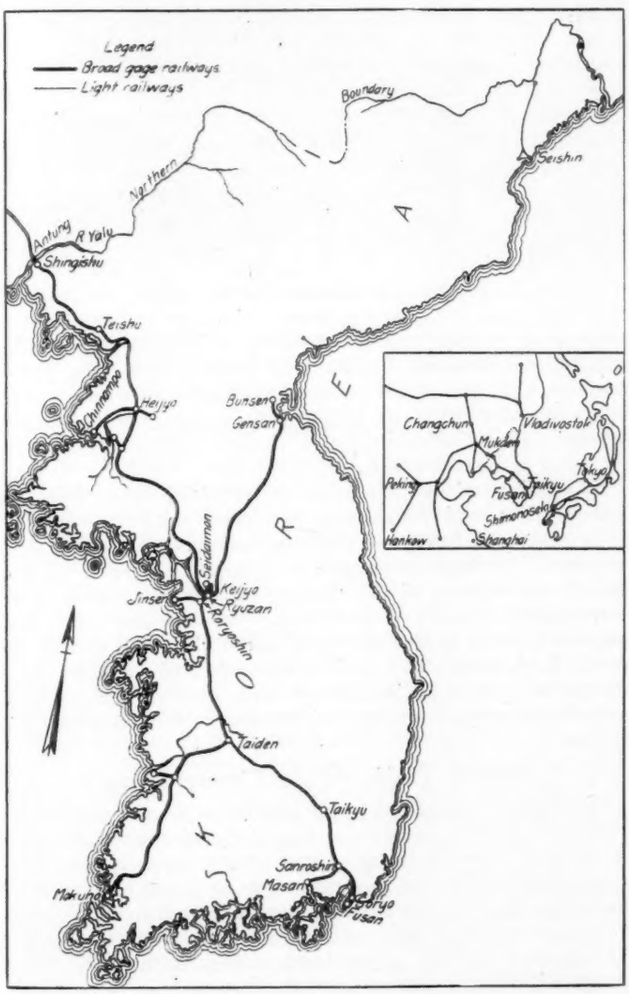
They Move Them as Easily as Wrecking Cranes

The Japanese Operated Railroads of Korea

Over One Thousand Miles of Railway Constructed in Asiatic Peninsula in Less Than Twenty Years

THE RAILWAYS OF KOREA, or of Chosen, as the Japanese would have us call it, have the distinction of being among the standard gage railways of the world which pay the lowest salaries and wages to their employees. The average monthly compensation on the railways of Chosen is only $11, about 37 cents a day, while the head of the system with its 1,000 miles of line receives only $292 a month.

The railways of Korea have the two-fold purpose of helping to develop Chosen for the Japanese, which control it,



Map of the Chosen Railways

and of serving as the connecting link between the railways and steamship lines of Japan and the railways to the west and north of Chosen, in Manchuria.

Twenty years ago there was not a mile of railway in Korea. Today there are 1,006 miles of line in the peninsula, practically all of which was constructed by Japanese engineers. The fact that these railways, like those controlled by the Japanese in South Manchuria, are all of standard gage merits more than ordinary attention. The Japanese are converted to the idea and advantages of standard gage railways and the work which they have begun on the Asiatic continent in the building of standard 4-ft. 8½-in. gage railroad lines is soon to be carried further by the contemplated change of the 3 ft. 6 in. gage railways of Japan proper to standard gage.

The railways of Chosen are divided into four main sections: (1) that from Keijyo to Fusan, 275 miles, connecting Keijyo or Seoul, as the capital of Chosen is sometimes named, to the port of Fusan where connection is made by fast steamer lines to the main line railroads of Nippon to Kobe, Osaka, Yokohama and Tokyo; (2) the line from Ryuzan near Keijyo to Autung, 310 miles, where direct connection is made with the railways in Manchuria; (3) the line from Taiden, a point between Keijyo and Fusan, to Mokuho; (4) the line from Ryuzan to the eastern coast at Gensan and Bunsen. There are also additional branch lines.

As a link in the transportation system between Japan and China the system benefits by an increasing flow of through traffic in addition to the intra-peninsula business which is still in its infancy and a fertile field for development. The Nipponese have shown characteristic aptitude in encouraging both passenger travel and freight movement in Chosen. Excursion rates and reduced fares for Koreans going to market at the larger cities have swelled passenger receipts and encouraged industry. Electric lights, electric fans, heat, drinking water and toilet facilities in passenger coaches, sleeping and dining car service, railway hotels and hospitals, medical attention by physicians on the payroll of the system, and other accommodations for the comfort of patrons of the lines have all tended to make travel more attractive. In a like manner the simplification of custom house transactions, the introduction of the principle of reconsignment, the reduction of rates for longer hauls, the establishment of a system of rebating and the opening of warehouses at the larger stations have encouraged freight movement.

History of Chosen Lines

The history of the railway lines in Chosen dates back to a concession to build and maintain a railroad between Keijyo, the capital, and Jinsen, its seaport, which the Korean government granted in 1896 to James R. Morse, an American. In May, 1897, while construction work was in progress, the Kei-Jin Tetsudo Hikiuke Kumiai (Syndicate) purchased the concession and continued the work. Other private companies undertook the extension of the Korean railway system. In September, 1899, a line between Jinsen and Roryoshin, about 20 miles in length, was opened to traffic, and the remaining section between Roryoshin and Seidaimon in Keijyo, 5 miles, was finished in July, 1900, thus completing the railway between Jinsen and Keijyo. The construction of a 270-mile line from Keijyo to Fusan, the port at the southeastern extremity of Korea, was undertaken in August, 1901, and completed in January, 1905. A 300-mile extension from Keijyo to Shingishu, on the Manchurian frontier, and a 25-mile branch from Sanroshin to Masan, a port near Fusan, were opened to general traffic in April, 1908. When the nationalization of the railways in Japan was decided upon in 1906, the Imperial Government of Japan purchased the Keijyo-Fusan and the Keijyo-Jinsen lines, establishing the Railway Bureau of the Residency-General of Korea at the same time. In September of the same year the Keijyo-Shingishu and the Sanroshin-Masan

lines were also acquired and placed under the jurisdiction of the Railway Bureau. These lines were taken over by the Imperial Government Railways in December, 1909, but in October of the following year they were transferred to the jurisdiction of the Government-General of Korea.

The first construction work of the railways in Chosen was carried on rather hurriedly, with a view to connecting the extreme South with the extreme North of the country as quickly as possible and joining a few of the important seaports with the trunk line by means of branches. Within a few years after their completion, however, reconstruction work was undertaken and finished in due time. With the construction of a bridge over the Yalu river and the rebuilding of the Antung-Mukden line in Manchuria, the Chosen railroads assumed world-wide importance as a link in communication between China and Japan, and hence between Europe and Japan.

Other units added to the Korean railway system include lines from Taiden to Mokuho at the southern extremity of Chosen from Keijyo to Gensan on the northeast coast, and from Keijyo to Chinnampo, a western port, totaling 348.3 miles, and the Gensan-Bunsen section of the projected Kankyo line along the northeastern seaboard, 12.5 miles. The program for 1916 was to build two more units of the Kankyo line, one from Bunsen to Yeiko, 21.4 miles, and another from Seishin to Sohyo, 32.2 miles. The total operated mileage of the Korean roads at the end of the fiscal year 1915 was 1006.5 miles, or an increase of 368.6 miles over the mileage at the end of the fiscal year 1906.

Connections with Japan and Manchuria

The railways of Chosen connect with the railways in Japan by fast and regular steamship service between Fusan in the south and Shimonoseki, the southeastern terminus of the main line railway of Nippon. Similarly a through connection is made with the South Manchurian railway in the

View at Fusan Pier

north at Antung by a bridge over the Yalu river between Antung and Shingishu.

This steamship connection with Japan and the consummation of international affiliations have proved a potent factor in increasing freight traffic on the Chosen lines. Following the completion of the bridge over the Yalu river and the reconstruction of the Manchurian line from Antung (on the Yalu river) to Mukden in 1911, through traffic arrangements were made with the Manchurian, Siberian and Russian lines whereby the Chosen trunk line (Antung to Fusan) became a portion of the great passenger and freight route from Japan to Europe. At a conference held at Moscow in June, 1913, the Korean railways were recognized as a part of three great international transportation routes, i. e., via Siberia, via Siberia and Suez, and the round-the-world route via Siberia and Canada. Through traffic agreements with the various Chinese roads were effected in 1914 and 1915 and have further added to the importance of the Chosen system.

When the Residency-General took over the management of the lines in 1906, they could not be operated to their fullest capacity because of the inadequacy of existing transportation facilities. Since that time through passenger service has been established between Fusan and Shingishu, the termini of the main line at each extremity of the peninsula, express service has been inaugurated on the Keijyo-Jinsen and other branch lines and general increases have been made in the number of trains run. With the construction of the Yalu river bridge and the rehabilitation of the Antung-Mukden (Manchurian) line in 1911, tri-weekly service was inaugurated between Keijyo, Korea, and Changchun, Manchuria, and all trains on the Chosen trunk line were operated as far as Antung, on the boundary with Manchuria. The opening of through service between Korea and Manchuria thereupon resulted in the revision of the steamer schedules between Shimonoseki, Japan, and Fusan, Chosen, to provide for daily instead of every-other-day service. At the same time the night train between Fusan and Keijyo, which had been run every other night, was run nightly and this innovation in conjunction with a daily passenger train between Keijyo and Antung, completed daily through service in Korea. Since June, 1912, the time of the through trains has been shortened and the run of the tri-weekly Chosen-Manchuria express which operated between Changchun and Keijyo was extended to Fusan. The construction of a new pier at Fusan facilitated passenger transfers from steamers to trains, and the revision of time-tables on the imperial Government Railways of Japan made close connections with the steamers at Shimonoseki possible, thereby tying Manchuria to Japan with a dependable regular service. There has also been a through freight service over the same route since January, 1913.

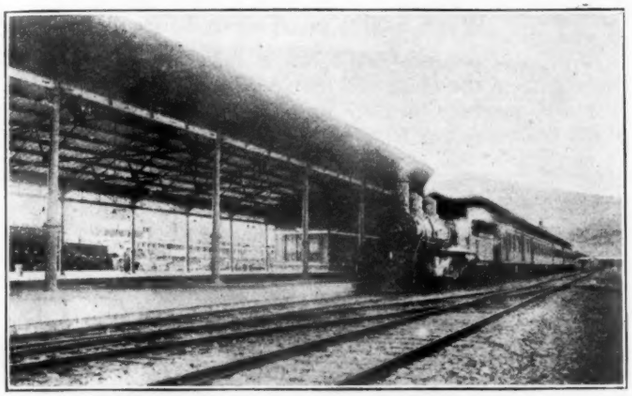
The policy of adding trains and revising time-tables in both Chosen and Manchuria continued until the fall of 1914 when the European war resulted in a decrease in the number of through passengers. This necessitated a reduction in the service of the Chosen-Manchuria express from three times a week to once a week. On the other hand, the Gensan-Bunsen section of the Kankyo line was opened to traffic in August, 1915; and in September of the same year schedules on the Keijyo-Gensan line were revised to provide for closer connections with the other lines running into Keijyo.

Freight Traffic on the Chosen Lines

Freight traffic has developed gradually as industries have increased in number and size, and as trade relations and traffic connections between Korea, Japan and Manchuria have become closer. The first year after the nationalization of the lines showed an increase of four per cent, both in the volume of freight and of receipts, over the previous year. In the following year (1907) arrangements for through traffic were improved, transactions at custom houses were very much simplified, a system of rebates was established to encourage shipping and other changes were made, all of which resulted in heavier traffic. In 1912 rates were reduced, the principle of reconsignment was put into practice, and rates for long hauls were further reduced with a resultant increase in shipments, especially after the reduction in rates on import freight which became effective at the end of the year.

A special reduction in rates on cotton cloth and cotton yarn consigned to Manchuria and an increase in rice exports to Japan contributed to the favorable showing in 1913. Although the inauguration of through-freight service between Japan and Manchuria in January, 1913, encouraged

the exportation of rice and other grains, an economic depression set in towards the end of the year and continued until 1915. In the latter part of that year increases in the price of rice and other grain contributed to a revival in traffic. Greater activity in mining enterprises was reflected in a great volume of ore shipments. Timber, salt and coal traffic also increased appreciably and through business between Japan and Manchuria assumed greater importance. Freight statistics of the Korean roads for the fiscal year 1915 showed an aggregate tonnage of 1,656,640, a ton mileage of 179,945,269, and receipts amounting to 3,356,200



Station at Fusan Steamer Dock

yen ($1,678,100), as compared with a tonnage of 391,175, a ton mileage of 24,777,710 and receipts totaling 1,088,498 yen ($544,249) in 1907.

Korean Passenger Traffic

The passenger traffic of the Chosen lines has similarly increased both relatively and absolutely since their nationalization in 1906, although adequate statistics are not available for a direct comparison of results achieved before and after they were taken over by the Railway Bureau of the Residency-General of Korea. In the second year of operation by the Bureau riots in different provinces of Chosen affected passenger business adversely. In the following fiscal year, however, the opening up of the Keijyo-Shingishu and Masan lines, and the adoption of a uniform passenger rate for all the lines resulted in increased traffic. Night train service and an increase in the number of trains run further induced travel. Subsequently, a reduction of through service and a re-arrangement of local train service were necessitated by the economic reaction following the Russo-Japanse War. Thereafter no marked increase in passenger traffic occurred until 1910, when business conditions began to improve. In 1911 there was a further improvement in business and in 1912 when a reduction in passenger fares was made the number of short-distance passengers greatly increased. Excursion trains and special trains for large parties of visitors proved very popular, with a resulting increase in passenger receipts. In the following year the initiation of the policy of selling tickets at reduced rates to Koreans going to market at the principal towns swelled the number of travelers. In the same year the opening of through traffic between Japan and Manchuria and China marked a new epoch in the railway history of Korea.

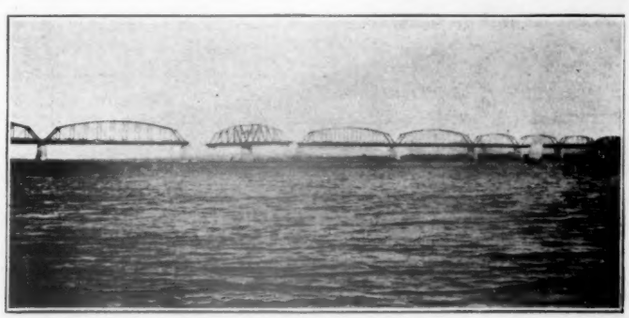
The beginning of the present world war was reflected in a heavy decrease in passenger traffic in 1914. Although this period of depression continued in 1915, the Industrial Exhibition which took place at Keijyo in September in commemoration of the establishment of the Government-General in Chosen produced a revival in passenger travel which continued even after the close of the exposition. The number of passengers carried during the fiscal year 1915 totaled 5,040,471 and the receipts 3,961,593 yen ($1,980,796), as compared with 2,625,772 passengers and receipts of 2,118,744 yen ($1,059,372) in 1907.

Well-directed publicity, traffic affiliations with foreign companies, improvements in service, and the economic betterment of Chosen have all contributed in producing these satisfactory results. The railways have co-operated with newspapers in holding train exhibitions and in other undertakings to stimulate passenger travel. A rise in the standard of living in Korea and greater interest in travel, as well as a better understanding of the country's attractions, has resulted in an increase in tourist parties. For the convenience of tourists from foreign countries arrangements were made with Thomas Cook & Son, the International Sleeping Car Company, the Nordisk Resebureau and the Tourist Bureau for the sale of tickets both to points in and through Korea to Japan or Manchuria.

In 1908 dining-car service was inaugurated on the Korean lines. Dining cars are equipped with writing tables, and boards and men for Japanese chess are loaned to passengers on request. Emergency medicine cases are provided on express trains, and first and second class cars are equipped with drinking water, electric fans in summer and steam heat and stoves in winter. First and second class sleeping cars are run on the Keijyo-Fusan line, extending from the capital to the extremity of the peninsula, and all express trains on the Keijyo-Fusan, Keijyo-Shingishu and the Keijyo-Jinsen lines are electrically lighted. To meet the needs of both passengers and employees, railway hospitals have been built at Ryuzan, Taiden and Soryo on the Keijyo-Fusan line, and, in addition, physicians in the service of the railways are available at all the principal stations.

Rolling Stock, Warehouses, Hotels, Maintenance Work

At the end of the fiscal year 1915 the rolling stock of the Chosen lines consisted of 169 locomotives, 337 passenger cars and 1,604 freight cars. The latest type of locomotive in use is a ten-wheel superheater locomotive weighing 112 tons. Seven other classes of engines are in use, three of which are of the saddle-tank type. All passenger cars have four-wheel trucks and are fitted with steam heat, air-brakes, vestibules, electric lights and fans. The largest type of car has a capacity of 104 persons. The freight cars



Railway Bridge Over Yalu River

are all of the four-wheel truck type except some of 50-ton capacity, which have six-wheel trucks. Most of the freight cars are provided with air-brakes and have capacities ranging from 22 to 26 tons. Some four-wheel freight cars of 10-ton capacity are still used at the different shops.

In 1912 the Chosen lines opened hotel accommodations for tourists in the upper floors of the station buildings at Fusan and Shingishu. A five-story fireproof hotel, costing 840,000 yen ($420,000) was completed in Keijyo in October, 1914. In the following year a small hotel was built at Kongo-san (Diamond Mountain), a resort on the Keijyo-Gensan line. In the fiscal year 1915 the guests at these hostelries numbered

2,505 and the gross receipts amounted to 108,218 yen ($54,109).

The first railroad warehouses in Chosen were opened at 11 stations in July, 1913. Since that time warehouses have been constructed at nine other stations. Warehousing in Korea, however, is still far below the needs of the country, to the disadvantage of industrial development.

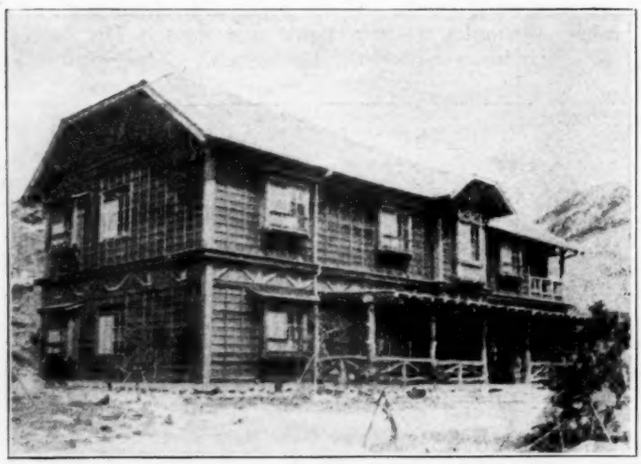
Maintenance work on the Korean lines in 1915 included the handling of 21,692 cu. yd. of earth work, 132,664 cu. yd. of ballast, 205,632 sq. ft. of painting, the renewal of 321,387 ties and the transfer of 8.8 miles of rails. In addition, 2,935 telegraph poles and about 630 miles of wire were renewed and a number of bridges and buildings were repaired.

Telegraph Facilities

In the fiscal year 1915 the 156 telegraph offices on the Chosen lines handled 4,279,790 railway messages and 179,730 public messages. To take care of the increase in business an additional telegraph line was added in 1915 between Ryuzan and Teishu and one of the lines between Taikyu and Soryo was extended to Fusan. Prior to 1906 facilities for telegraphic communication on the Korean system were crude and rudimentary. In 1908 with the inauguration of through passenger service between Fusan, at the extremity of the peninsula, and Shingishu, at the Manchurian frontier, a through telegraphic circuit between Ryuzan and Soryo was installed. When the railway bridge over the Yalu River was completed and through Korean-Manchurian train service was established in 1911, all telegraphic circuits along the lines were changed. Subsequently, additional circuits were opened between Ryuzan and Taiden, between Ryuzan and Shingishu, and from Ryuzan to Mokuho.

Employees' Relief Association

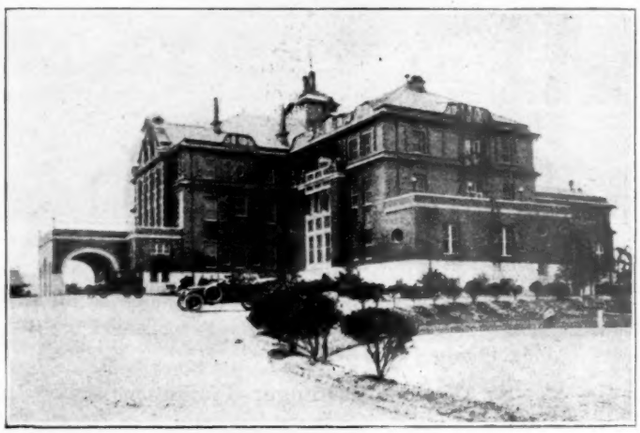
The Relief Association of the Chosen railways was established in April, 1910, as a part of the Relief Association of the Imperial Government Railways of Japan, but in October of the same year when the roads were taken over by the Governor-General it became an independent organization. Benefits granted by the association fall under two heads: one for injuries and the other for death and old age. Injury benefits cover expenses arising from injuries to members while on duty and compensation to employees permanently disabled, the latter ranging from the equivalent of wages or salary for from one month to two and one-half years in the case of the Japanese and half that amount for Koreans. Benefits for death and old age are granted in the case of an employee's death before the age of 55 years or upon his reaching that age. The amount of the benefits varies according to age, length of membership in the association and the amount of salary or wages. Refunds are made to members who retire from the organization before reaching the age of 55. The benefit funds are supported by government subsidy and contributions by the members. In the fiscal year 1915, 8,430 out of 9,234 employees and officers of the lines were members, and of this number 5,114 were Japanese and 3,316 Koreans. Total receipts, including the government subsidy, members' contributions and interest amounted to 114,051 yen ($57,025), while expenditures totaled 47,644 yen ($23,822).



Railroad Hostelry in the Diamond Mountains

Wage Scales on Korean Lines

The wage problem in Chosen is insignificant when considered from the point of view of American standards. In 1915, the average monthly wage of the 8,699 employees of the system was but $10.81. Japanese constituted 5,359 of the total number employed and received an average compensation of $13.06 a month, or nearly twice as much as the wage of the 3,340 Korean employees who received but $7.23. Even the 531 officers of the lines received an average salary of but $46.40 a month. The munificent salary of the chief executive officer, known as engineer in chief, was 583.32 yen a month, or the equivalent of $291.66.



Railway Hotel at Keijyo

Operating Results

Comparisons of Korean operating data for the fiscal year 1915 with statistics of all American lines having annual operating revenues above $1,000,000, for the year ended December 31, 1916, show marked differences in transportation conditions in the two countries. The average receipts per passenger on the Chosen lines amount to but $.0106 a mile, or barely more than one-half the American average of $.02042. This low rate of return is compensated for by the heavier loading of Korean passenger trains. Whereas the average number of passengers per train-mile on American railroads is but 57, Chosen roads carry 118.3 per train-mile, or over twice as many. Freight traffic statistics, on the contrary, show lower receipts and heavier train-loading for railroads in the United States. Average receipts per ton per mile in Korea are $.0093 as compared with $.00706 on American lines; the average trainload in Chosen is but 91.6 tons as against 560 tons in the United States. It is interesting to note that average receipts have been falling steadily in Korea, while the average tonnage per train has been increasing. In 1907 the average trainload was but 29.3 tons, or less than one-third the trainload in 1915; the average receipts per ton per mile, on the other hand, were reduced from $.0219 in 1907 to $.0093 in 1915.

In the first two years following the nationalization of

the Korean lines in 1906 net losses were incurred in the operation of the system. Following general improvements in facilities, increases in traffic resulting from the steady industrial development of Korea and reductions in operating expenses, the lines became self-supporting. In 1908 the subsidy received from the government amounted to only 181,000 yen ($90,500) as compared with 433,000 yen ($216,500), the amount estimated as necessary to cover the annual losses of the lines. In the next year despite an economic depression, an epidemic of cholera and an unusually severe winter, no subsidy was required. Since then the financial condition of the roads has been improving steadily. In 1913, the net returns were almost double those of the previous year as a result of the increase in freight and passenger business following the opening of the Keijyo-Gensan line and a part of the line from Taiden to Mokuho.

The beginning of the war in Europe caused a decline in transportation for a time, but later a revival of business and an increase in rail shipments because of the scarcity of ships resulted in a recovery in the receipts of the Chosen system. In the fiscal year 1915 operating revenues amounted to 8,934,430 yen ($4,467,215) and operating expenses to 7,155,866 yen, leaving a balance of 1,778,564 yen ($889,282). The opening ratio for the year was, therefore, 80.01.

Railroad Enterprise Awakening the East

A Yankee naval officer first brought the light of occidental civilization to Japan. With a lapse of but 65 years, the enterprise, energy and initiative of the Nipponese have won for them the name of "Yankees of the East." Having transformed their own island kingdom into a progressive and powerful commercial and industrial state, they have undertaken also to awaken continental Asia from its lethargy by tapping its immense undeveloped resources and introducing modern economic standards. Knowing that improved transportation is the necessary forerunner of material welfare, the adaptable Japanese have proved themselves worthy imitators of the Caucasian nations in opening up new avenues of trade on both land and sea. As indicated by the review of their railway undertakings in Chosen, they have successfully penetrated the exclusiveness of the "Hermit Nation," thereby acquiring a territory 86,000 square miles in area, in which to exercise their genius for development.

Car Building Plants and Railroad Repair Shops

A Census Report on This Subject Gives Some Interesting Figures on These Plants for 1914

In 1914, there were 103 establishments engaged in the manufacture of freight and passenger cars for steam railroad service. These plants hired on the average 58,988 persons and the total value of products was $194,775,669. In the same year also there were 1,362 steam railroad car repair shops, which shops hired on the average 361,925 persons and the value of the products of which was $514,041,225.

These figures are contained in a report of the Bureau of the Census entitled Steam and Electric Cars and Railroad Repair Shops which has just been made public. This report presents statistics for (1) establishments building cars for use on steam railroads; (2) those building cars for use on electric railroads; (3) the operations of repair shops by steam railroad companies, and (4) the operations of repair shops by electric railroad companies. The first two classes include the reports of car-manufacturing establishments not including the operations of railroad companies, while the last two classes include the reports of railroad companies covering only the operations of their machine and repair shops. The value of products of the latter group is not a selling value, but a value equal to the operating expenses, such as salaries and wages, cost of materials, and miscellaneous expenses. An abstract of the report follows, the numbers of the tables being retained as in the original report.

Table 1 summarizes the statistics of the four industries for 1914 and gives a comparison of the total with 1909, together with the percentages of increase.

General Statistics of Car Building Plants and Railroad Repair Shops

Table 1	TOTAL.			CARS: 1914.		RAILROAD REPAIR SHOPS: 1914.	
	1914.	1909.	Per cent of increase.[1]	Steam.	Electric.	Steam.	Electric.
Number of establishments	2,128	1,810	17.6	103	14	1,362	649
Persons engaged	453,414	376,071	20.6	58,988	4,286	361,925	28,215
Proprietors and firm members	16	10		11		1	4
Salaried employees	29,368	24,800	18.4	4,689	446	22,406	1,827
Wage earners (average number)	424,030	351,261	20.7	54,288	3,840	339,518	26,384
Primary horsepower	615,684	442,113	39.3	126,687	10,014	433,994	44,989
Capital	$590,268,801	$431,188,849	36.9	$157,811,109	$14,751,532	$354,092,369	$63,613,741
Salaries and wages	330,655,874	249,417,044	32.6	48,348,202	3,199,674	258,548,615	20,559,383
Salaries	33,645,325	24,274,568	38.6	6,954,623	732,647	24,043,517	1,914,538
Wages	297,010,549	225,142,476	31.9	41,393,579	2,467,027	234,505,098	18,644,845
Paid for contract work	355,875	866,151	−58.9		129,904	201,375	24,596
Rent and taxes (including internal revenue)	3,329,777	2,272,373	46.5	909,059	108,718	1,730,343	581,657
Cost of materials	399,988,119	297,594,642	34.4	132,200,159	6,349,779	243,828,607	17,609,574
Value of products	757,888,412	569,102,781	33.2	194,775,669	10,494,953	514,041,225	38,576,565
Value added by manufacture (value of products less cost of materials)	357,900,293	271,508,139	31.8	62,575,510	4,145,174	270,212,618	20,966,991

[1] A minus sign (−) denotes decrease; percentages are omitted where base is less than 100.

The Car Building Plants

Table 14 shows in detail the statistics of cars built for use on steam railroads by establishments engaged primarily in their manufacture, for 1914, 1909, 1904 and 1899.

There was an increase of 2.1 per cent in the number of steam-railroad cars built in 1914, as compared with 1899, while the value for the same period shows an increase of 101.6 per cent. The average value of passenger-service cars increased from $7,526 in 1899 to $12,800 in 1914, and freight-service cars from $533 in 1899 to $825 in 1914. This increased cost per car is due largely to the more extensive use of steel in the construction of cars and the building of larger cars.

In addition to the cars manufactured by establishments assigned to this industry in 1914, there were 17 steam-railroad cars, valued at $72,034, built by establishments engaged primarily in the manufacture of electric-railroad cars; 10,745 cars, valued at $11,999,983, by repair shops of steam-railroad companies; and 4,114 cars, valued at $2,566,915, by establishments engaged primarily in other industries, making a total of 14,876 cars, valued at $14,638,932, as compared with 23,693 cars, valued at $19,362,855 in 1909.

Of the total number of steam-railroad cars reported in 1914, 9.8 per cent were all-wood; 47.8 per cent, steel underframe; 3.3 per cent, steel body with wood interior; and 39.1 per cent, all-steel. A larger percentage of the passenger-service than of the freight-service cars were steel; 84.8 per cent of the passenger-service cars were all-steel, and 9.7 per cent were steel body with wood interior. Of the freight-service cars, 49.1 per cent were steel underframe, of which 71.5 per cent were box cars, and 37.8 per cent were all-steel, of which 50.1 per cent were gondolas.

Cars Built for Steam Railroads by Establishments Making Cars Primarily

Table 14 PRODUCT.	1914	1909	1904	1899
Total value [1]	$194,775,669	$123,729,627	$111,175,310	$90,510,180
Steam-railroad cars:				
Number	120,084	74,778	102,646	117,569
Value	$140,157,583	$75,521,432	$87,289,248	$69,529,312
Passenger service [2]—				
Number	3,434	1,601	2,030	979
Value	$43,955,798	$13,829,607	$18,140,293	$7,368,299
Baggage and express—				
Number	438	216	199	72
Value	$3,642,629	$1,105,779	$896,185	$238,554
Mail—				
Number	145	95	95	42
Value	$1,497,824	$600,912	$576,230	$197,465
Passenger [3]—				
Number	1,645	957	428	331
Value	$19,577,886	$7,209,425	$2,955,517	$1,975,469
Chair, dining and buffet, parlor, sleeping, and all other—				
Number	1,206	333	1,308	534
Value	$19,237,459	$4,913,491	$13,712,361	$4,956,811
Freight service—				
Number	116,650	73,177	100,616	116,590
Value	$96,201,785	$61,691,825	$69,148,955	$62,161,013
Box—				
Number	50,481	29,728	38,184	47,838
Value	$40,952,538	$23,982,446	$28,508,632	$26,562,893
Caboose—				
Number	340	537	160	193
Value	$420,568	$525,605	$150,977	$184,865
Flat—				
Number	4,731	3,232	5,412	4,525
Value	$3,120,084	$2,033,801	$3,893,154	$1,923,525
Gondolas—				
Number	25,077	19,607	9,518	11,821
Value	$22,808,750	$18,128,186	$5,518,084	$6,873,145
Hopper [4]—				
Number	9,754	11,473	27,998	28,857
Value	$10,708,407	$9,419,655	$21,367,218	$18,414,718
Refrigerator—				
Number	5,800	2,618	3,353	2,354
Value	$8,077,062	$2,747,957	$3,042,835	$1,956,097
Stock—				
Number	3,929	2,349	4,235	2,760
Value	$2,587,065	$1,586,008	$2,453,123	$1,426,800
Tank—				
Number	1,250	.....	.....	.....
Value	$1,255,167	.....	.....	.....
Other varieties—				
Number	[4] 15,238	3,633	11,756	18,242
Value	[4] $6,272,144	$3,268,167	$5,214,932	$4,818,970
Electric-railroad cars:				
Number	194	603	418	935
Value	$711,198	$2,023,922	$994,654	$1,090,854
Passenger—				
Number	161	558	331	902
Value	$635,804	$1,903,317	$930,791	$1,062,172
Other—				
Number	33	45	87	[5] 33
Value	$75,394	$120,605	$63,863	[5] $28,682
All other products, value	$53,906,888	$46,184,273	$22,891,408	$19,890,014

[1] In addition, 14,876 cars, valued at $14,638,932, and parts and repairs, valued at $980,074, were reported in 1914, and 23,693 cars, valued at $19,362,855, and parts and repairs, to the value of $210,487, were reported in 1909, by establishments engaged primarily in other industries.
[2] Includes gasoline motor cars for use as passenger cars by steam railroads for 1914 and 1909.
[3] Reported as coal and coke cars in 1909, 1904, and 1899
[4] Includes 9,737 logging, mining, industrial, and dump cars, valued at $1,825,693.
[5] Includes 25 cable cars, valued at $21,232.

Railroad Repair Shops

Scope of the combined industry.—This industry is divided for census purposes into two classes—cars and general shop construction and repairs by steam-railroad companies, and cars and general shop construction and repairs by electric-railroad companies.

Every steam or electric railroad company of any magnitude operates one or more repair shops, chiefly for the purpose of maintaining the efficiency of the rolling stock. Such shops often manufacture complete cars and some of them manufacture complete locomotives. While the bulk of the work of the repair shops is on the rolling stock, they also do shopwork in connection with the construction and repair of bridges, buildings, etc. Most of the work done is on rolling stock operated by the company, but some companies do work of this character for others. The products are not ordinarily given a selling or contract value. The amount reported as the value for 1914 usually represented the cost of materials, salaries, wages, rent, and taxes. At prior censuses a miscellaneous expense item was reported, which to that extent increased the value of products. For steam-railroad repair shops this item amounted to $3,946,043 in 1904 and $5,886,066 in 1909, and for electric-railroad repair shops $285,483 in 1904 and $702,536 in 1909. The steam-railroad repair shops are far more important than the electric-railroad repair shops. In fact, measured

The Railroad Repair Shops Divided by Value of Products

Table 29 VALUE OF PRODUCT.	Census year.	Number of establishments.	Average number of wage earners.	Value of products.	Value added by manufacture.
All classes	1914	1,362	339,518	$514,041,225	$270,212,618
	1909	1,145	282,174	405,600,727	206,187,315
Less than $5,000	1914	44	115	133,531	81,776
	1909	52	152	163,034	98,548
$5,000 to $20,000	1914	154	1,584	1,865,296	1,202,354
	1909	149	1,515	1,760,898	1,124,545
$20,000 to $100,000	1914	358	14,430	19,548,203	12,158,925
	1909	286	12,059	14,701,863	8,963,187
$100,000 to $1,000,000	1914	684	168,586	237,177,633	133,985,665
	1909	564	152,534	199,863,116	109,493,358
$1,000,000 and over	1914	122	154 803	255,310,562	122,783,898
	1909	94	115,914	189,111,816	86,507,677
Per cent distribution:					
Less than $5,000	1914	3.2	[1]	[1]	[1]
	1909	4.5	0.1	[1]	[1]
$5,000 to $20,000	1914	11.3	0.5	0.4	0.4
	1909	13.0	0.5	0.4	0.5
$20,000 to $100,000	1914	26.3	4.3	3.8	4.5
	1909	25.0	4.3	3.6	4.3
$100,000 to $1,000,000	1914	50.2	49.7	46.1	49.6
	1909	49.3	54.1	49.3	53.1
$1,000,000 and over	1914	9.0	45.6	49.7	45.4
	1909	8.2	41.1	46.6	42.0

[1] Less than one-tenth of 1 per cent.

by the number of persons employed, they constitute one of the important industries covered by the statistics of manufactures.

Size of establishments.—The tendency of the industry to become concentrated in large establishments is indicated by the statistics given in Tables 29 and 30.

Fuel.—Coal is the principal class of fuel used in steam-railroad repair shops. In 1914, 506,696 tons of anthracite,

Railroad Repair Shops Divided by Number of Employees

Table 30 — WAGE EARNERS PER ESTABLISHMENT.	NUMBER OF ESTABLISHMENTS.				AVERAGE NUMBER OF WAGE EARNERS.			
	1914	1909	Per cent of total. 1914	Per cent of total. 1909	1914	1909	Per cent of total. 1914	Per cent of total. 1909
All establishments	1,362	1,145	100.0	100.0	339,518	282,174	100.0	100.0
1 to 5 wage earners	76	87	5.6	7.6	234	281	0.1	0.1
6 to 20 wage earners	194	164	14.2	14.3	2,503	2,128	0.7	0.8
21 to 50 wage earners	202	148	14.8	12.9	6,840	4,993	2.0	1.8
51 to 100 wage earners	213	162	15.6	14.1	15,634	11,848	4.6	4.2
101 to 250 wage earners	287	238	21.1	20.8	45,788	37,247	13.5	13.2
251 to 500 wage earners	197	180	14.5	15.7	67,492	63,821	19.9	22.6
501 to 1,000 wage earners	131	122	9.6	10.7	91,041	84,619	26.8	30.0
Over 1,000 wage earners	62	44	4.6	3.8	109,986	77,237	32.4	27.4

and 5,486,405 tons of bituminous coal were consumed in this industry. The other fuel used was coke, 79,597 tons; oil, 2,508,703 barrels; and gas, 1,829,902,000 cubic feet.

Special Statistics of Repair Shops

Table 32 gives in detail the statistics of steam-railroad repair shops for 1914, 1909, 1904, and 1899.

The table shows fewer locomotives and cars built in steam-railroad repair shops in 1914 than during some of the earlier census years. The number of locomotives decreased by 85, or 31.2 per cent, from 1899 to 1914, and the number of cars built, by 16,188, or 60.1 per cent, but the total value of work done in these shops shows an increase of 135.5 per cent for the 15 years.

In 1914 the motive power and machinery department reported 46.1 per cent of the total value of products; car department, 47.3 per cent; bridge and building department, six-tenths of 1 per cent; and all other, or unclassified products, 6.1 per cent.

Statistics of Railroad Repair Shops, 1899, 1904, 1909 and 1914

Table 32 — CLASS OF WORK.	1914	1909	1904	1899[1]
Total value	$514,041,225	$405,600,727	$309,775,089	$218,238,277
Motive power and machinery department, value	$236,723,724	$184,971,870	$149,643,953	$94,447,260
Locomotives built—				
Number	187	215	148	272
Value	$3,594,003	$3,289,140	$1,853,939	$3,276,393
Repairs to locomotives, motors, etc	$169,057,932	$127,928,773	$101,326,805	$57,383,143
Work for other corporations	$7,053,430	$4,735,004	$5,681,307	$3,338,589
All other products or work	$57,018,359	$49,018,953	$40,781,902	$30,449,135
Car department, value	$242,976,774	$199,768,939	$149,748,820	$118,376,552
Cars built, value	$11,999,983	$13,326,171	$12,990,011	$16,521,352
Passenger—				
Number	123	218	414	390
Value	$1,233,302	$1,291,354	$2,337,977	$1,441,733
Freight—				
Number	10,314	13,972	14,742	26,543
Value	$10,513,676	$11,767,664	$10,006,642	$15,079,619
Car department, value—Contd.				
Cars built, value—Continued.				
Other—				
Number	308	359	2,000	(2)
Value	$253,005	$267,153	$645,392	(2)
Repairs to cars of all kinds	$183,753,538	$147,194,065	$105,319,032	$74,665,500
Work for other corporations	$14,819,984	$8,784,239	$6,946,990	$7,084,857
All other products or work	$32,403,269	$30,464,464	$24,492,787	$20,104,843
Bridge and building department (shopwork), value	$3,127,644	$2,799,898	$5,096,141	$5,414,465
Repairs and renewals	$2,449,821	$1,906,737	$4,351,487	$3,937,170
Work for other corporations	$37,061	$46,496	$40,581	$241,626
All other products or work	$640,762	$846,665	$704,073	$1,235,669
All other products and work not classified, value	$31,213,083	$18,060,020	$5,286,175	(2)

[1] Includes $124,619 reported for Alaska.

[2] Not reported.

DAYLIGHT SAVING IN FRANCE will begin on Saturday, March 9, when all clocks will be set forward an hour at midnight.

Cinderella

Or the Little Coal Slipper

By B. L.

ONCE UPON A TIME, in the reign of good king Wudro, there was a man named Samuel who, on account of his easy-going nature, was generally known as Uncle Sam. He had a little daughter named Cinderella. She had a step-mother and besides two step-sisters called Industrie and Husbandrie, who hated little Cinderella because they did not want to share with her. They treated her like a servant and she had to fetch and carry everything; all the coal and wood, and goods of every kind that came into or out of Uncle Sam's house, Cinderella had to carry. They were constantly scolding her so that life was miserable for the poor child. The sisters dressed in rich gowns and went to balls and parties, while Cinderella had to say at home in her torn and shabby clothes. Cinderella grew very fast, so that her clothes became too small for her, but every time she went to her step-mother and complained that her skirts had become too short and that her stockings were full of holes, her step-mother would say that five per cent more would make the skirts plenty long enough, and that she did not really need the stockings, reminding Cinderella that she was eating too much and suggesting many ingenious ways how Cinderella could do more work on less food.

It happened one evening that King Wudro gave a grand ball for his officers, who were going to the war, and invited Cinderella's step-sisters, who were now prouder than ever, but no one thought of the little girl at home, who felt so sad and lonely. Just as she was thinking how unhappy she was, her fairy godmother, Traffique, appeared before her.

"What troubles you, dearie?" she asked. "Would you like very much to go to the King's ball tonight?"

"O, very much, indeed!" answered Cinderella.

"Well," said her godmother, "you shall go and be the most beautiful lady there. Fetch me a large pumpkin out of the garden," said the fairy. Cinderella lost no time in doing as she was bid, bringing in a venerable yellow pumpkin known as a "Gentlemen's Agreement." No sooner had the god-mother touched the pumpkin with her wand, then behold! it was changed into a grand carriage. She then had four mice brought in belonging to the Brotherhoods, which she turned into horses. Four lizards, who had been executives, became footmen, and a wise old rat was changed into a suave coachman.

Cinderella could hardly believe her eyes. Just as she

looked down at her ragged clothes the good fairy waved her wand over her, and there stood Cinderella in a most magnificent ball gown, looking more beautiful than ever. To complete the toilet, the fairy gave her a pair of tiny coal slippers, which fitted her dainty feet perfectly. The only drawback to Cinderella's costume was that for the sake of efficiency she had to wear also a union suit, and there was a terrible law in the kingdom, called the Sherman Act, which punished with death anyone wearing such a garment.

The fairy then warned Cinderella on no account to remain at the ball after 12 o'clock, for if she did all her finery and splendid livery would be changed back again and she would once more be the shabby Cinderella.

Prince Makadu, a most noble and active gentleman, was told that a beautiful princess had arrived and he hastened to greet her. He led her into the ball room, where everyone looked at the charming girl. The prince danced with Cinderella many times, for he had never seen so lovely a lady. Cinderella had such a delightful time that she forgot to watch the clock, and suddenly she heard twelve strokes ring out, her fairy garments began to give her the greatest anxiety and she heard a terrible voice, supposed to be that of the King's Executioner, crying out in a voice of thunder, "Are you wearing a union suit?" Without saying good-bye to the prince, she rushed from the palace, and in her haste lost one of the coal slippers, the only gift of the fairy's that had remained unchanged, for when she reached the door she found that at the sound of the terrible words she had heard, the coachmen and footmen had run away, and instead of the fine horses there were only four small mice, squeaking for over-time upon a minute basis.

The prince was very sad when he missed the beautiful princess. He ran to the gates to see if any trace of her could be found; but the only thing he saw was a little coal slipper which Cinderella had lost in her flight, and he vowed that he would marry the lady whose foot it fitted.

So the next day a herald went through the town, going from house to house to fit the dainty slipper. All the ladies tried it on, but no matter how hard they squeezed their feet, it did not fit. At last the herald arrived at Cinderella's home. Her two step-sisters quickly stepped forward but they could not possibly manage to move the coal. They were greatly disappointed, and just as they were about to give up the attempt they heard Cinderella's gentle voice asking, "Will you let me try?"

As soon as her dainty foot slipped into the fairy shoe, it fitted perfectly! Then to the surprise of all, she pulled the companion slipper out of her pocket and put it on the other foot. Cinderella was the only girl in the kingdom who could accomplish this movement of coal, or keep it on foot. Just at this moment the fairy god-mother appeared and waved her wand over Cinderella. There again stood the magnificent lady of the ball with her beautiful dress studded with anthracite. The herald was delighted to have found the charming princess for whom the prince had been searching. He took Cinderella to the palace and Prince Makadu was so happy that she could move the coal that he made no objection to her costume, but thought only of her efficiency.

He married her at once, so at last Cinderella became a real princess. In the bride's trousseau there was a beautiful garment of the finest silk, which fitted her from wrist to ankle, like a glove. You will have to guess what it was, but I can tell you this, it made Cinderella very efficient.

She and the Prince lived happily together for ever—perhaps it would be better to say—for ever since.

MARACAIBO, VENEZUELA, IMPORTED RAILROAD MATERIALS valued at $68,919 from the United States in 1915, and $94,186 in 1916. The share of the United States in the import trade of this district rose from about 43 per cent in 1913 to 72 per cent in 1916.

Gaines Wall and Firebox Efficiency

By Jno. D. Rogers

Shop Superintendent, Virginian Railway, Princeton, W. Va.

THE WRITER has had an opportunity during the past six years of observing the advantages of the Gaines type of firebox construction from a practical and operating standpoint, both on passenger and freight locomotives. In considering the design of modern power, the question of firebox proportion is of primary importance, and should be given the most careful consideration, keeping in mind the ratio of grate area to heating surface. In the past the grate area has been limited by the endurance of the firemen. Since the introduction of successful stokers, this is no longer a function of steam making capacity. We now have stokers successfully firing grates of 100 sq. ft. and over, with apparently no limit to even further increase in grate area. The most important factor in firebox design is having proper depth of throat sheet; this is limited by the wheel arrangement. Few modern locomotives can have the mud ring over the driving wheels without a sacrifice being made in the design of the ash pan, and in many cases, even with the use of trailer wheels, ash pans are designed in such a manner that they choke the grate, making them very difficult to clean, at the same time limiting the air opening to the underside of the grate.

The source of all trouble in many bad steaming locomotives is in the ash pan, yet the front end, bad coal, and improper firing get the blame. Most grate failures can be traced to fire on the flares of the ash pan, choking off the draft, and causing the grates to become overheated.

With the Gaines wall the depth of throat sheet does not have to be considered, as, regardless of the depth of the fire, flues cannot be affected, nor can the misuse of the blower combined with dirty coal, or dead fire, have the usual bad results; flues leaking on locomotives with this construction are unheard of, cold air cannot reach them, and the writer has known of locomotives in service two years or more without any work being performed on the flues; in fact, no more than inspection of firebox by the boilermaker.

With all the advantages of the superheater there is no device that is more inefficient when the superheater flues are stopped up. To get results the flues have to be cleaned. This means every two or three trips. A green fireman may choke a full set of flues before he gets his train out of the yard by improper firing. It costs money to remove arches and blow flues. A great many locomotives could be turned "on the pit" if it were not for the flues being stopped up. I have no record of a locomotive equipped with a Gaines wall and combustion chamber having a flue choked; consequently the superheater operates at maximum efficiency, at the same time saving delay and expense at terminals. Most of the sparks are caught in the combustion chamber, which is easily cleaned at any time.

Even with the best designed fireboxes it is difficult to keep the bottom flues open, which means that a great part of this heating surface is continually out of service; at the same time choking these flues causes them to leak. A great proportion of our flue trouble can be traced to this source.

The Gaines type of firebox should be especially adapted to roads operating in terminals that have rigid smoke restrictions. The fact has been demonstrated that this firebox gives more complete combustion with the result that criticism from smoke inspectors is reduced to a minimum, while at the same terminals other locomotives cause frequent complaints. The Gaines walls, under most severe conditions, last from eight to twelve months, maintenance being simply a matter of patching the wall occasionally with fire clay.

Railroad Bill Sent to Conference for Final Adjustment

Period of Federal Control After War and Rate-Making Authority Still Points of Difference

WASHINGTON, D. C.

BY OVERWHELMING MAJORITIES both Houses of Congress have declared that the taking over of the railroads by the government is a war measure, that the legislation for their control is emergency legislation enacted to meet conditions growing out of the war, and that the existing system of government control shall continue only during the war and for not longer than a specified period thereafter. The question as to what the period shall be was referred to conferees appointed by the House and by the Senate after the railroad control bill was passed by the House on February 28, substantially in the form in which it was written by representatives of the administration and as passed by the Senate on February 22, but with differences on two important points and in several less important particulars. As passed by the Senate, the bill provided that the period of federal control shall continue for not longer than 18 months after the proclamation of peace terminating the war and the bill as passed by the House provded that it shall continue during the period of the war "and for a reasonable time thereafter, which shall not exceed two years next following the date of the proclamation." Both bills provide, in nearly identical language, that the President may, prior to July 1, 1918, relinquish control of all or any part of any railroad or system of transportation, further control of which he shall deem not needful or desirable; and the President may at any time during the period of federal control agree with the owners thereof to relinquish all or any part of any railroad or system of transportation. He may also relinquish all railroads at any time he shall deem such action needful or desirable and in such case no right to compensation shall accrue to the owners from the date of the relinquishment.

The administration had at first opposed fixing any definite time for the return of the roads to their owners, but apparently acquiesced in the idea of a time limit, when the opposition to such a plan became pronounced, and only 10 senators and 40 representatives voted for an indefinite period. Both bills contain the express declaration that nothing in the act is to be construed as expressing or prejudicing the future policy of the federal government concerning the ownership, control, or regulation of carriers or the method or basis of the capitalization thereof.

Affirmative action by Congress will, therefore, be required to prevent the return of the roads to their owners after the war, whereas under the terms of the bill as it was originally introduced, providing that the period of government control should continue until Congress ordered otherwise, a failure of Congress to agree as to the disposition of the roads would have meant an indefinite period of government control.

The House passed the bill by a vote of 336 to 6. Only two democrats and four republicans voted against it—Representatives Thomas, Kentucky; Gordon, Ohio; Chandler, Oklahoma; Dennison, Illinois; Hangen, Iowa; and Ramseyer, Iowa. It is understood that the leaders had planned to avoid a record vote on the bill but a roll-call was demanded by Representative Dennison. The Senate had passed the bill without a roll-call.

The Senate appointed as conferees Senators Smith, of North Carolina, Pomerene and Townsend, and the House appointed Representatives Sims, Doremus and Esch. Later Senators Robinson and Cummins were added.

The principal sections of the bill governing the method of compensation of the roads, on the basis of the average net operating income for three years as the standard return as proposed by President Wilson, with provision for special treatment in exceptional cases, were not altered either by the House or by the Senate, but the House bill contained a provision omitted in the Senate, providing that the compensation should be increased by a percentage on the additional investment, estimated at about $240,000,000, during the last half of 1917. It is understood that the conferees have agreed to eliminate this provision. The House bill did not include the Senate amendment that "there shall be no increase of compensation for any additions, improvements or betterments constructed out of or purchased by the earnings for investment or surplus earned during the period of federal control."

Another important question submitted to the conferees was as to whether the President or the Interstate Commerce Commission should have final authority over rates. The Senate bill provided that the President may initiate rates but that they shall be subject to review by the commission. The House bill also provided for a review by the commission of rates initiated by the President but authorized the commission merely to report its recommendations to the President.

The most important contests in the House were on the issues as to whether the President or the Interstate Commerce Commission should have final authority over rates and as to the period of federal control. In committee of the whole an amendment by Representative Sweet giving the authority to the commission was adopted by a vote of 164 to 157, but when a separate vote was taken before the final passage of the bill it was defeated 210 to 165, leaving the provision as reported by the committee. This authorized the President, when in his judgment it is necessary, to initiate rates by filing them with the commission and provided that they should be "fair, reasonable and just" and that the commission should hold hearings and make a report of its findings and recommendations (which shall prima facie be taken as correct) to the President for his final action. The Sweet amendment provided that the commission should retain its full jurisdiction over rates but, during the period of federal control, should "consider all the facts and circumstances growing out of unified coordinated federal control occasioned thereby."

An amendment proposed by Representative Esch to reduce the period of control after the war to one year was also adopted in committee of the whole, 143 to 11, but was defeated in the House 164 to 205. An amendment by Representative Barkley to leave the period indefinite was voted down 143 to 40. Representative London proposed to make the time 99 years, and received 4 votes, while there were 102 against it.

The playing of politics in connection with the bill was manifested in the votes on various amendments, rather than in the passage of the bill itself, particularly on the period of government control and on the rate-making power, the Republicans generally expressing themselves in favor of the shortest period of the continuance of the federal control system after the war and against giving the President power to control rates. There was a strong Republican line-up behind the Esch amendment to reduce the period after the war to one year, on the theory that this might possibly terminate the present system before the next Presidential election, but there was a surprising change in the

votes as taken in committee of the whole, where they were not recorded individually, and as taken separately just before the final passage of the bill. Some 16 Republicans from the western states where the Farmers' Non-Partisan League has a strong influence, with its advocacy of government ownership, voted for the Esch amendment, under cover of the non-recorded vote, but switched and voted against it when a roll-call was taken.

The House adopted an amendment similar to that of the Senate providing for the inclusion of short line roads in the federal system, providing that "every railroad not owned, controlled, or operated by another carrier company, and which has heretofore competed for traffic with a railroad or railroads of which the President has taken the possession, use and control, or which connects with such railroads and is engaged as a common carrier in general transportation, shall be considered as within federal control, as herein defined and necessary for the prosecution of the war, and shall be entitled to the benefit of all the provisions of this act."

In general the House bill contained more qualifications and restrictions on minor points than did the Senate draft. In the provision for the purchase of railroad securities by the President the House inserted, out of an abundance of caution, the words "out of the revolving fund created by this act," because some of the members objected to an unrestricted power. It was also provided that any securities so purchased shall be held by the Secretary of the Treasury, who shall, under the direction of the President, represent the United States in all matters in connection therewith in the same manner as a private holder thereof, and that the President shall make a detailed report of receipts and expenditures from the fund each year.

An amendment adopted on the motion of Representative Lenroot provides that no person employed in connection with the operation of railroads or systems of transportation under Federal control, except those persons referred to in the preceding paragraph of the bill which authorized the President to employ government agencies such as the Interstate Commerce Commission, shall be deemed to be an officer or employee under the United States within the meaning of the excess profits tax nor a civil employee of the United States within the meaning of the federal compensation act.

A section not in the Senate bill sought to protect short lines by providing that nothing in the act shall be construed to affect the routing instructions over and the traffic arrangements of such railroads as may not be taken over unless such arrangements and instructions prejudice the transportation of war materials or of government supplies.

The House was also more cautious than the Senate in its amendments of the section numbered 10 in the Senate bill and 11 in the House bill. The former provides that "carriers while under federal control shall, in so far as is not inconsistent therewith, or with the provisions of this act, or any other act applicable to such federal control, or with any order of the President, be subject to all laws and liabilities as common carriers," and that "suits may be brought by and against such carriers and judgments rendered as now provided by law." The House omitted the words "in so far as is not inconsistent therewith, or with the provisions of this act, or any other act applicable to such federal control, or with any order of the President." It also added that "no defense shall be made thereto upon the ground that the carrier is an instrumentality or agency of the federal government," and that "any final judgment heretofore rendered or that hereafter may be rendered against any common carrier under federal control shall be paid out of the sum accruing as compensation to the carrier against which such judgment is or was obtained."

Another section declares moneys and other property derived from the operation of the carriers during federal control to be the property of the United States but provides that unless otherwise directed by the President such moneys shall not be covered into the treasury, but shall remain in the custody of the same officers and be accounted for in the same manner as before federal control.

A provision of the House bill not in the Senate draft provides that the owners of a railroad making an agreement with the President for compensation shall accept all the terms and conditions of the act and any regulations or order made by or through the President under authority of the act or of the act of August 29, 1916, under which the President took over the roads.

The House also added by a vote of 31 to 24 an amendment proposed by Representative Parker of New Jersey providing that overlapping and deferred accounts and claims, which are usually paid as current operating expenses, shall be paid out of operating income and on the surrender of the carriers they shall be returned subject to any such overlapping accounts.

The conferees expected to reach an agreement at a night session on Wednesday. An agreement fixing the period of government control after the war was reached on Wednesday, and, after a conference with the President, Senator Smith announced that he had a compromise plan as to the rate making authority to propose which he thought would be accepted. Under this plan the Interstate Commerce Commission would continue to have jurisdiction over rates that would be required to take into consideration increased expenses.

Demurrage on Heatless Days

THE INTERSTATE COMMERCE COMMISSION, Division No. 2, has issued a set of rulings on various questions which have arisen as to the application of demurrage rules and storage charges on the fuelless days designated by the Fuel Administration order of January 17. The questions were as follows:

First.—May the fuelless days designated by the Fuel Administrator be considered legal holidays as that term is used in the demurrage code?

Second.—Should demurrage charges be collected on a shipment such as asphalt which arrived at destination on January 18 and which because of its consistency could not be unloaded without first being heated and which was not heated because of the consignee's understanding of the Fuel Administrator's order?

Third.—Should demurrage charges be collected on cars containing freight which could not be loaded or unloaded without the use of a derrick operated by power derived from fuel?

Fourth.—Should demurrage charges be collected on shipments to a large industrial concern which could not load or unload them without certain inter-plant switching which could not be performed without power derived from fuel?

Fifth.—Should storage charges be assessed on less-than-carload freight which was not removed because an industry completely ceased operation on the fuelless days as the result of its understanding of the Fuel Administrator's order and of the instructions of the local fuel administrator?

It was held, as to the first question, that the fuelless days designated by the Fuel Administrator may not be considered legal holidays as that term is used in the demurrage code.

As to the second and third questions, it was held that a particular shipper's understanding of the Fuel Administrator's order is not conclusive, as different shippers may

construe the order differently; and that in cases where power or heat derived from fuel is necessary and customary for loading or unloading property, cars arriving and set for loading or unloading on January 18 should be treated exactly as though set for loading or unloading on January 23. In other words, in the circumstances of these cases, no demurrage charge should be assessed.

As to the fourth question, it was held that demurrage charges should be collected on shipments to industrial concerns which failed to load or unload cars because it is alleged that they were prevented by the Fuel Administrator's order from using locomotives for inter-plant switching. The Commission does not consider that there was any prohibition upon the plant locomotives from using power where necessary for loading or unloading any more than there was a prohibition against the use of locomotives for general railroad business.

As to the fifth question, it was held that storage charges should be assessed on less-than-carload freight not moved because the industry ceased operation on the fuelless days as the result of its interpretation of the Fuel Administrator's order, or the instructions of the local fuel administrator.

R. S. Lovett Director of Betterments and Additions

DIRECTOR GENERAL MCADOO has announced the creation of an additional division in his organization, that of Betterments and Additions, and has appointed Judge Robert S. Lovett director of the new division. Judge Lovett has resigned as chairman of the executive committee of the Union Pacific, and has severed his connections with all other corporate interests to devote himself exclusively to his new work for the government. He has also resigned as a member of the War Industries Board of the Council of National Defense.

As director of the Division of Betterments and Additions of the Railroad Administration, Judge Lovett will receive and pass upon the reports made by the railroads as to their budgets of necessary expenditures for improvements and in general will have supervision over capital expenditures.

R. S. Lovett

Judge Lovett was born June 22, 1860, at San Jacinto, Texas. He entered railway service in 1884 as local attorney of the Houston East & West Texas. Since then he has been consecutively assistant general attorney and general counsel for the Texas & Pacific; general counsel of the Southern Pacific lines in Texas, while a member of the law firm of Baker, Botts, Baker & Lovett; president of the Houston & Texas Central, and general counsel of the Union Pacific-Southern Pacific system, and from 1904 to 1909 was vice-president and general counsel for the same roads. Since September 13, 1909, he has been chairman of the executive committee of the Union Pacific System. From October 21, 1909, to October 1, 1911, he was also president of the same system. From September 13, 1909, to January, 1913, he was also chairman of the executive committee of the Southern Pacific Company. Judge Lovett has been in Washington since shortly after the United States entered the war, and has been chairman of the priorities committee of the War Industries Board. He was also, until the government took over the railroads, director of priority in transportation.

Chicago-St. Louis Passenger Service Rearranged

ON RECOMMENDATION OF R. H. AISHTON, regional director for the western railroads, Director General McAdoo has provided a plan for the rearrangement of passenger train service between Chicago and St. Louis on a non-competitive basis. There are at present 15 passenger trains between the two cities, many of which leave at the same hour over different railroads. The new plan, which is to become effective on March 17, contemplates a reduction to nine trains more evenly distributed throughout the day, and provides that tickets shall be made interchangeable so that the traveling public will be afforded increased train facilities. The day trains are arranged to run from 9:00 a. m. until 12:00 noon, and the night trains from 9:00 p. m. until 11:30 p. m. on the following schedule:

	Southbound	
Railroad	Leave Chicago	Arrive St. Louis
Illinois Central	9:00 a. m.	6:00 a. m.
Chicago & Eastern Illinois	10:00 a. m.	6:00 p. m.
Chicago & Alton	10:15 a. m.	6:00 p. m.
Wabash	12:02 p. m.	7:57 p. m.
Chicago & Alton	9:00 p. m.	7:00 a. m.
Illinois Central	9:45 p. m.	7:25 a. m.
Wabash	10:00 p. m.	7:30 a. m.
Chicago & Alton	11:30 p. m.	7:45 a. m.
Chicago & Eastern Illinois	11:30 p. m.	7:40 a. m.

	Northbound	
Railroad	Leave St. Louis	Arrive Chicago
Illinois Central	8:25 a. m.	5:25 p. m.
Chicago & Eastern Illinois	9:00 a. m.	5:30 p. m.
Chicago & Alton	12:05 p. m.	7:45 p. m.
Wabash	12:05 p. m.	7:45 p. m.
Chicago & Alton	9:00 p. m.	7:00 a. m.
Illinois Central	9:45 p. m.	7:15 a. m.
Wabash	10:00 p. m.	7:30 a. m.
Chicago & Alton	11:30 p. m.	7:45 a. m.
Chicago & Eastern Illinois	11:30 p. m.	7:40 a. m.

This provides for three morning, one noon and five night trains from Chicago to St. Louis, and two morning, two noon and five night trains from St. Louis to Chicago. This schedule curtails excessive service formerly offered to the public under competitive conditions, but has been arranged so as to leave service which will be entirely adequate, while effecting a total saving of 15,706 train miles per month, an estimated saving in coal of 9,538 tons per month. The traveling public will have a choice of a greater number of hours of departure and arrivals than heretofore by using the road which has a train at the desired time, and the reduction will have an effect in reducing considerably the interference with freight traffic by passenger trains. The total cost per month of the service to be reduced is estimated at $76,310.

Consideration has been given by Mr. McAdoo's staff and by the regional directors to similar plans of rearrangement of service between other important cities, announcement of which is expected shortly.

NEW JAPANESE SERVICE TO SOUTH AMERICA.—Announcement is made by the Nippon Yusen Kaisha that it has definitely decided to open a new service to South America. With three steamers, each of 6,000 tons gross, the service will be operated every two months, making six round trips a year. Among the principal ports of call are Yokohama, Kobe, Singapore, Durban, Cape Town, Santos, Rio de Janeiro, and Buenos Aires.

General News Department

The Wisconsin & Michigan announces that its operating headquarters have been moved from Peshtigo, Wis., to Menominee, Mich.

The paint shop of the Florida East Coast, at St. Augustine, Fla., together with five passenger cars, was destroyed by fire on February 19.

Daniel Willard, president of the Baltimore & Ohio, has been again chosen chairman of the Advisory Commission of the Council of National Defense.

Gordon Grant, formerly chief engineer of the National Transcontinental Railway, of Canada, has been appointed adviser to the Canadian Minister of Railways, a new office created by the Dominion government.

Twenty two hundred and forty men from the Pacific system of the Southern Pacific are now serving their country in the army or navy. This is 366 more than had joined the colors at the time that the statistical issue of the *Railway Age* was published (January 4).

Free transportation for soldiers is proposed in a bill which Representative Steenerson has introduced in Congress. He would authorize free transportation for both officers and men, of the Army, the Navy and the Marine Corps, when on furlough, to and from their homes.

Albert J. Stone, operating vice-president of the Erie, has been appointed Assistant to A. H. Smith, Regional director, Eastern territory, United States Railroad Administration; headquarters, Grand Central Terminal, New York City; D. C. Porteous, secretary of the Seaboard Air Line, has been appointed assistant to John Skelton Williams, director of the Divisions of Finance and of Purchases of the Railroad Administration.

Exportation of railway material to Spain has been the subject of negotiations between the War Trade Board and the Spanish government, now nearly completed, providing for the exportation of a large amount of materials and supplies from the United States to be used in the rehabilitation of the Spanish railroads; this in return for assistance from Spain in furnishing supplies to the American Army in France and in the use of Spanish ships for some of our ocean traffic.

Obsolete or obsolescent locomotives may be useful somewhere, and Director General McAdoo has addressed a circular letter to the presidents of Class I railroads asking for information regarding all locomotives which are not in service by reason of age, condition, size, weight, etc., but which, if in good condition or properly repaired, could be used to advantage on roads of less traffic density or more favorable operating conditions. Information is asked regarding the character of the engines, their power and dimensions, general condition of boilers, fire boxes and machinery, and approximate cost of repair.

The Morkrum rapid telegraph is being installed on a number of important circuits of the Pennsylvania Railroad. The Pennsylvania already has rapid printing telegraphs in operation on lines between Pittsburgh and Philadelphia, between Altoona and Philadelphia, and between Washington and Philadelphia. All of these printing systems are worked on telephone trunk circuits. Most of the operators are women or boys. In the transmission of car reports and other reports to be copied on printed forms, the printing telegraph instrument records them on regular message forms and from these the receiving operator transcribes the figures to the form on which the code letters are printed.

Railroad Employees' Income Tax Returns are the subject of a circular which has been issued by Director General McAdoo. It appears that, numerous railroad employees who are not paid fixed annual salaries have not kept accurate records of their earnings for the calendar year 1917, and, therefore, find it difficult to make an accurate return under the law. The director general asks the railroads to give to each employee who does not receive a fixed annual salary and who is included in the railroad's report to the collector of internal revenue, a statement as to the amount of compensation shown in such report as having been received by him, in order to facilitate the making of accurate tax returns.

Requirements for steel rails during the current year, is a subject concerning which Director-General McAdoo has asked for information from the railroads. A circular has been addressed to the presidents of all Class I carriers asking them to send information to the Interstate Commerce Commission showing the number of gross tons of new rail placed in track during the calendar year 1917, the estimated amount required for 1918, separately for maintenance and construction, the minimum amount required to maintain track in safe condition during the year, the tonnage contracted for delivery, including that due on previous contracts or carried over on contracts for the previous year, and the tonnage of rail on hand on January 1.

A train of sixty automobile freight trucks, started from Buffalo, New York, by the War Department on February 12 reached New York city, about 440 miles, on February 28, having encountered serious delays because of bad roads. The trucks were two weeks in reaching Amsterdam, about 260 miles. On one day they accomplished only six miles: the longest day's run was 77 miles. Snow from 3 ft. to 5 ft. deep was encountered in many places and the roads, for considerable distances, were not wide enough for the five-ton trucks. On one occasion, the men in charge, 170 of them, had to sleep in the trucks, having found it impossible to reach a town. One man was injured while chopping ice away from truck wheels and one truck fell down a 60-ft. embankment. These trucks were loaded with automobile parts, consigned to the War Department storehouse at Baltimore, Md.

Contractors on new subway construction work in New York City are facing serious financial perplexities because of the high prices of material and of wages, and scarcity of help; and the Public Service Commission of the state has called upon the city authorities to join the commission in devising measures of relief. The number of men now at work for the contractors is about 7,000, as compared with an average of 12,000 in April, 1917; and those now at work are being constantly offered better pay elsewhere. The Public Service Commission fears a complete stoppage of the work, and consequent delay in the opening of the new routes, which would impose upon the city great losses. Remedial legislation is needed at once. The contractors are said to be willing to complete the unfinished work on the basis of cost of labor and materials, without profit. The Public Service Commission, in its annual report, issued in January, expected that some 40 or 50 miles of tracks in the new subways would probably be opened for traffic early in this year. The completion of these lines has been much delayed by the contractors' difficulties.

Railroad Contributions

The Railroad Administration, under the direction of C. A. Prouty, director of the division of public service and accounting, is conducting an investigation to determine whether and to what extent during the period of government control railroads should continue to make contributions to the support of associations of commerce, boards of trade and similar civic organizations. Railroads have not only become members of such associations, paying dues in the same way that other members do, but they have also in some cases made special contributions; and, in order to determine his policy in the matter, the Director General is collecting information as to the character of the practice and the

amount of money involved. For this purpose a circular letter has been addressed to various organizations asking them to furnish the names of railroads; whether the amount of dues is determined by rules or by-laws of the organization, or whether it is voluntarily determined by the railroad, and whether there is any limitation as to the use to which the contribution shall be put.

Railroad Wage Commission

A special session of the Railroad Wage Commission was held on February 28 at Washington to hear testimony by Miss Pauline Goldmark, representative of the Consumers' League of New York, and other organizations, regarding the employment of women in railroad work. She said that women first were employed in any considerable number by the railroads about a year ago, at the instance of the Railroads' War Board, and that while they were at first employed for clerical and other light work they have since been employed in increasing numbers for heavier work in freight yards, track repairs and shops. Some of this work, she said, involved too great a physical strain, as in cases where they are required to lift heavy weights.

Bolsheviki Destroy Bridges on Trans-Siberian

Advices received at Washington Monday indicated that German controlled Bolsheviki elements in Siberia had begun operations to prevent Japan and the Entente Allies from controlling the eastern end of the Trans-Siberian Railroad. John F. Stevens, chairman of the American Railway Commission, reported to the state department that the Russians had begun destroying bridges on the Trans-Siberian between Lake Baikal and the Manchurian frontier. It is believed that this action is aimed at preventing any advance of Japanese troops to carry out police duties.

All the bridges on the railroad have been permanently mined for some time. Russians believe that the Bolsheviki may blow up many of these structures. The Bolsheviki, they insist, will pursue the same tactics toward the Japanese as they have against the Germans, and will refuse to recognize them as friends.

Minnesota Appeals for Cars

The State Public Safety Commission of Minnesota recently sent a personal appeal to President Wilson for cars needed to move 13,000,000 bushels of potatoes from northern Minnesota. The text of the telegram, which was signed by Governor Burnquist and the chairman of the commission reads, in part, as follows:

"Minnesota, in response to requests from your administration and as a patriotic duty, produced 33,000,000 bushels of potatoes last year; 13,000,000 bushels on hand are spoiling for want of a market, but principally for the want of refrigerator cars to move them. Cannot the supply division of the quartermaster's department furnish an immediate outlet for a large part of the same and the director of railways furnish transportation to move this enormous supply of valuable foodstuffs? Failure to do so at once means destruction of the supply and a small acreage this year. All other sources of relief but your good self have been appealed to without success. Here is an opportunity to cut red tape and produce results."

Thirty-seventh Regiment Electrical Engineers, Being Recruited

A regiment of electrical engineers is being recruited in Chicago as rapidly as possible for service in France. The selection of the staff of commissioned officers has practically been completed, though the selection of non-commissioned officers has not been made and the men who enlist will have chances for these places. Men who are skilled in the following trades will be enlisted: Cooks, machinists, blacksmiths, metal workers, foundrymen, patternmakers, plumbers, electricians, pipe fitters, draftsmen, storemen, carpenters, welders, boilermakers, bricklayers, masons, chauffeurs, handymen and linemen. The regiment will also need operators of oil, steam and gasoline engines and electrically driven pumps.

The regiment will be known as the 37th Engineers and will be commanded by Col. Theodore A. Dillon, an officer of the Engineering Corps of the Regular Army, who has been relieved from duty as electrical engineer of the Panama Canal to command this regiment. A special recruiting office has been opened at 120 West Adams St., Chicago, in charge of Major Arthur B. Kratz, Engineer Officers' Reserve Corps, also formerly on the Panama Canal.

West in Need of Cars

At a conference in Washington last week with Director-General McAdoo and the other regional directors, R. H. Aishton, in charge of western lines, made an appeal for additional cars for his territory to take care of emergency movements. Cars are especially needed to move potatoes from the northwest and live stock from Iowa, Illinois and South Dakota. As a result of the meeting it was decided to deliver a thousand cars a day to western roads until further notice.

The special trainload movements of flour, grain and meat, arranged for by the western regional director in co-operation with the United States Food Administration, and outlined in the *Railway Age* of March 1, page 473, have been carried out according to schedule and are proving an excellent method of taking care of export demands. Priority is still being given to the movement of grain in 11 western states and, since February 22, priority has been extended to cover farm implements, incubators, egg cases and egg case fillers.

Railroad Commission Investigates Possible Economies

The Railroad Commission of California recently completed an investigation of possible economies of operation of transportation companies in that state during the war. In a report handed down on February 9, the commission made a number of recommendations, including the following:

1. Labor Shortage: To obtain needed unskilled labor the Federal government should remove the entrance tax and suspend the literary test so as to permit the importation of Mexican labor. The importation of Oriental labor is not necessary in view of the availability of Mexican labor. To obtain skilled labor universities and technical schools should establish courses in railroad shopwork, including practical training in railroad shops.
2. Competition: No construction work on competitive lines unless so far progressed that stoppage would entail a considerable loss; instead, use existing facilities jointly.
3. Priority: All orders should be handed to the railroads through one central bureau.
4. Cross-hauls: Steps should be taken to do away with all unnecessary cross-hauls.
5. Franchise Requirements: State, county and city government authorities not to require utilities, during the present emergency, to live up to franchise requirements which call for improvements that are not absolutely necessary in the operation of the public utility affected.
6. Supplies: The establishment of a priority by the Federal government as between requirements of railroads of the United States and orders for foreign governments and industries in this and other countries.
7. Reconsignment: Suspension of this privilege on all commodities with the exception of perishable products and the reduction of such privileges on perishable products to a minimum.
8. Team Tracks: All existing team tracks to be used jointly by any carrier which is able to reach them.
9. Short Haul Freight: All short haul freight, particularly less than carload shipments, to be handled by inland water transportation companies, interurban electric lines and motor trucks.
10. Advertising: The considerable expense incurred by railroads in advertising could be materially reduced without impairment of efficiency.

American Gear Manufacturers' Association

"Gear Standardization" will be the principal subject of discussion at the second annual convention of the American Gear Manufacturers' Association, to be held at Green Brier Hotel, White Sulphur Springs, W. Va., on April 18, 19 and 20. An address by a representative of the United States Chamber of Commerce, of which the association has just become a member, will also bring matters of timely interest before the association.

The convention will begin with meetings of committees on Thursday morning, April 18. At 1:30 the first session will open with an address by President F. W. Sinram, "The A. G.-M. A.—Past, Present and Future." Following the address by the Chamber of Commerce representative, C. R. Poole will talk on "Hardening and Heat Treating of Gears," and B. F. Waterman will present the report of the Standardization Committee.

Friday morning's session will include reports of officers and committees, election of nine members of the Executive Committee and miscellaneous business. An informal banquet will be held in the evening.

On Saturday morning a paper on "Uniform Cost Accounting" will be presented by J. H. Dunn, and on "Hobs and Hobbing Machines" by a representative of the Barber-Coleman Company.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER, 1917.

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
Atchison, Topeka & Santa Fe	8,629	$7,989,848	$3,029,433	$12,308,969	$1,416,922	$2,032,551	$190,185	$4,339,234	$224,634	$8,134,015	66.08	$4,174,954	$982,006	$3,192,140	$432,870
Atlantic City	170	87,829	84,781	187,594	31,040	19,101	1,502	128,211	3,915	183,735	97.94	3,859	33,379	—29,520	—19,846
Baltimore & Ohio	4,948	7,648,808	2,065,666	10,668,050	499,348	2,262,750	186,348	5,556,302	234,127	8,816,119	82.64	1,851,931	455,298	1,389,261	—1,154,152
Boston & Maine	2,305	2,637,118	1,502,293	4,691,763	219,339	1,005,621	38,359	2,949,357	175,912	4,420,377	94.22	271,387	277,674	—10,078	—1,088,817
Central of New England	301	373,009	32,883	426,656	70,085	46,213	1,366	189,786	9,539	318,099	74.54	108,558	21,186	87,362	—39,714
Central of Vermont	411	246,108	247,969	362,311	—1,200	73,076	7,621	222,354	9,232	314,481	85.38	47,830	33,053	14,780	—50,594
Ches. & Ohio Lines	2,478	3,515,882	850,986	4,740,943	556,467	702,278	53,381	1,743,454	102,291	3,185,452	67.19	1,555,492	317,370	1,237,979	44,162
Chicago, Terre Haute & S. E.	374	334,288	22,469	364,391	37,899	80,439	4,782	139,566	9,636	273,249	74.99	91,143	30,000	61,106	—34,791
Cincinnati Nor.	245	155,054	15,886	176,990	—10,061	37,342	2,853	76,749	4,001	110,172	62.25	66,818	29,061	37,731	—4,773
Cleve., Cinn., Chicago & St. L.	2,386	2,665,894	1,188,654	4,244,428	113,796	756,759	75,990	2,054,254	97,760	3,126,177	73.65	1,118,251	356,478	761,528	—343,848
Galv., Harrisburg & San Ant.	1,360	1,150,568	561,647	1,829,025	—308,300	176,853	39,032	586,921	42,300	545,244	29.81	1,283,781	269,151	1,014,297	524,696
Georgia	334	326,546	159,009	537,133	39,212	53,300	16,556	225,188	12,741	347,153	64.63	189,979	8,647	181,124	91,844
Houston, East & West Tex.	190	122,423	53,143	187,359	7,680	23,131	2,229	63,510	3,570	100,058	53.38	87,301	15,307	71,968	20,596
Houston & Tex. Cent.	948	591,150	260,180	907,887	—41,464	90,986	18,382	304,057	20,595	392,291	43.21	515,595	110,999	402,925	122,145
Kanawha & Mich.	176	245,054	43,116	300,549	21,402	75,858	4,706	107,050	8,738	217,754	72.45	82,795	39,047	43,748	—23,991
La. Western	207	199,004	126,826	354,081	14,993	38,175	8,539	77,386	8,145	149,485	42.22	204,596	100,057	104,485	—23,009
Morgan's La. & Tex. R. R. & S. S. Co.	400	482,879	185,772	706,295	49,184	73,472	13,498	219,871	14,127	372,811	52.78	333,484	154,242	179,108	—52,457
New Orleans Grt. Nor.	284	122,288	40,476	165,926	25,065	20,772	3,319	60,605	6,935	116,941	70.47	48,985	7,781	40,964	6,543
New York Cent.	6,082	11,118,244	5,055,023	19,088,857	—1,423,635	2,301,792	242,177	8,759,467	504,269	10,650,308	55.79	8,438,549	1,268,051	7,168,990	1,271,954
New York, N. H. & H.	1,996	2,895,087	3,095,087	6,961,617	827,048	1,172,435	47,597	3,355,859	236,427	5,780,025	83.03	1,181,592	306,980	874,432	—911,928
Nor. Pac.	6,534	5,298,038	1,360,912	7,368,750	179,300	1,566,020	107,171	2,802,862	155,504	4,847,346	65.78	2,521,404	1,107,001	1,414,090	—1,831,528
Phila. & Reading	1,127	4,054,302	669,152	5,098,847	376,426	1,075,353	46,553	2,703,298	91,129	4,308,022	84.49	790,825	326,337	461,801	—1,049,891
Pitts. & Lake Erie	224	1,574,313	207,637	1,940,318	215,711	399,069	17,009	875,318	47,398	1,560,087	80.40	380,231	100,150	280,056	—504,345
Pitts. & W. Va.	63	104,192	10,804	127,419	—34,627	—2,992	1,517	47,683	5,238	22,900	17.97	104,519	11,601	92,917	*
Port Reading	21	105,221	.....	272,824	7,139	7,378	40	136,861	2,583	154,001	56.45	118,823	—10,669	129,492	115,114
Rich., Fred. & Potomac	87	245,456	386,810	797,827	16,005	58,053	4,130	191,958	9,129	303,364	38.02	494,462	183,602	310,852	173,630
St. L.-San Fran.	4,752	3,005,229	1,665,653	4,994,447	502,286	8,491,178	67,942	1,936,457	140,933	3,482,013	69.72	1,512,434	504,731	1,005,983	—411,174
Spokane, Portland & Seattle	554	343,245	170,373	565,853	65,492	51,490	10,744	169,014	16,407	317,243	56.06	248,610	73,358	175,219	38,613
Tex. New Orleans	468	367,774	182,993	590,321	34,996	88,122	10,165	205,427	12,062	361,158	61.18	229,163	41,479	187,631	87,012
Toledo & Ohio Cent.	435	465,762	67,292	583,557	89,021	125,447	6,425	325,898	12,247	561,216	96.17	22,342	25,693	—3,355	—73,198
Union Pac.	3,626	5,068,063	1,323,772	7,082,019	673,641	1,034,358	120,793	2,259,026	177,046	4,426,055	62.50	2,655,964	588,769	2,062,281	330,730
Wash. Sou.	35	76,241	232,392	435,943	15,723	21,374	1,504	104,621	4,325	158,239	36.30	277,704	95,904	181,798	118,788

CALENDAR YEAR 1917

Atchison, Topeka & Santa Fe	8,642	$98,801,488	$30,907,445	$140,978,936	$1,599,797	$23,544,428	$2,317,637	$44,172,008	$2,711,499	$88,504,050	62.78	$52,474,886	$10,661,865	$41,792,643	—$989,942
Atlantic City	170	1,180,377	1,868,898	3,215,426	355,643	256,700	40,512	1,671,830	16,988	2,341,724	72.83	873,701	153,379	720,230	123,603
Baltimore & Ohio	4,742	102,365,163	19,990,255	133,613,321	14,182,963	25,874,279	2,405,776	56,574,351	3,096,026	103,024,213	77.11	30,589,107	4,455,820	26,112,068	—2,353,529
Boston & Maine	2,305	35,080,863	17,827,342	59,450,779	6,192,311	8,786,745	446,567	29,970,443	1,473,770	47,164,941	79.33	12,285,838	2,156,649	10,125,398	—4,911,573
Central of New England	301	4,886,043	355,275	5,477,288	943,083	542,093	15,168	1,990,928	110,912	3,618,488	66.06	1,858,800	220,586	1,637,893	—438,338
Central of Vermont	411	3,024,512	965,596	4,482,811	438,660	719,623	98,180	2,320,257	124,989	3,730,313	83.21	752,497	200,837	551,406	—368,933
Ches. & Ohio Lines	2,412	42,998,223	7,899,452	54,643,794	6,905,579	10,521,724	694,131	18,537,582	1,119,731	38,105,806	69.73	16,537,987	2,439,331	14,095,160	—1,391,517
Chicago, Terre Haute & S. E.	374	3,493,016	220,137	3,805,025	440,352	937,156	55,135	1,323,131	104,717	2,889,489	75.94	915,536	235,857	667,888	151,805
Cincinnati Nor.	245	2,180,594	181,593	2,440,830	322,607	428,766	42,449	938,925	39,240	1,767,202	72.40	673,628	129,181	544,400	17,288
Cleve., Cinn., Chicago & St. L.	2,386	36,077,390	12,009,347	52,650,920	4,378,438	9,808,418	1,042,726	21,459,558	1,054,131	38,059,421	72.29	14,591,499	2,738,986	11,842,881	—1,916,985
Galv., Harrisburg & San Ant.	1,360	14,003,121	4,628,969	19,737,997	1,836,557	2,417,291	408,514	6,286,325	483,886	11,514,978	58.34	8,223,018	1,327,390	6,881,348	2,331,849
Georgia	334	2,858,362	1,169,337	4,366,637	349,070	603,210	171,327	1,699,733	115,645	2,940,044	67.33	1,426,594	73,954	1,352,283	324,473
Houston, East & West Tex.	190	1,308,980	433,517	1,862,980	226,042	195,287	26,609	611,626	39,339	1,102,913	59.20	760,067	163,671	594,588	58,277
Houston & Tex. Cent.	932	5,769,544	1,877,819	8,223,425	903,242	931,531	210,436	2,628,726	231,627	4,925,626	59.90	3,297,800	604,533	2,684,942	333,023
International & Great Northern	2,803	8,582,335	3,158,011	12,588,224	1,438,225	2,017,287	271,488	4,596,544	381,737	8,649,994	68.71	3,938,230	358,232	3,577,367	1,017,927
Kanawha & Mich.	176	3,055,085	419,191	3,606,991	421,511	895,700	41,147	1,092,140	92,449	2,543,126	70.51	1,063,865	280,385	783,457	—197,401
Kan. City, Mex. & Orient	272	1,003,351	151,106	1,217,344	187,106	320,047	62,854	560,343	71,943	1,202,293	98.76	15,052	75,363	—60,564	—99,491
Kan. City, Mex. of Tex.	465	1,052,531	191,200	1,308,779	221,702	291,429	47,463	669,843	57,252	1,287,689	98.38	21,089	64,434	—43,564	—86,856
Kansas City Southern	755	9,544,758	1,843,371	12,410,965	1,173,189	1,839,808	305,457	3,932,383	404,190	7,634,681	61.51	4,776,284	742,912	4,028,956	476,393
Lake Erie & Western	900	7,061,114	665,349	8,122,896	810,564	1,404,732	179,983	3,285,176	191,077	5,871,532	72.28	2,251,363	397,052	1,853,777	—557,183
Lehigh & Hudson River	96	2,027,164	49,345	2,247,617	230,542	349,754	19,401	805,951	62,159	1,467,806	65.30	779,810	98,400	681,408	—57,033
Lehigh & New England	296	3,505,273	15,994	3,666,567	409,841	557,315	34,268	1,154,185	108,315	2,263,645	61.75	1,402,922	230,954	1,171,968	55,206
Long Island	398	4,623,578	10,652,091	17,286,179	1,757,344	2,101,485	149,798	7,412,158	444,578	11,960,535	69.19	5,325,644	944,293	4,379,807	222,962
Los Angeles & Salt Lake	1,154	8,232,866	3,475,246	12,766,723	1,386,153	1,811,902	398,537	3,644,764	278,594	7,731,226	60.55	5,035,497	783,444	4,251,559	—6,157
Louisiana & Arkansas	302	1,214,523	293,282	1,569,722	281,681	260,689	46,346	484,463	53,338	1,123,396	71.56	446,326	116,788	329,485	—36,414
La. Ry. & Nav. Co.	342	1,877,609	478,978	2,497,535	314,446	320,864	77,947	944,642	80,153	1,738,052	69.59	759,483	208,052	550,928	262
La. Western	207	2,439,604	948,127	3,653,551	265,089	413,910	94,343	798,896	94,024	1,689,424	46.24	1,964,127	481,461	1,481,230	469,186
Louisville, Henderson & St. Louis	199	1,607,372	506,429	2,226,650	314,960	278,614	60,140	755,386	43,221	1,452,321	65.22	774,329	91,673	682,005	153,275
Maine Central	1,216	8,999,154	3,900,166	14,125,577	1,632,812	2,073,107	151,575	6,416,923	357,679	10,675,876	75.57	3,449,701	726,905	2,722,379	—680,218
Michigan Central	1,861	33,898,247	12,859,299	52,879,434	5,389,671	8,026,084	865,239	22,211,260	973,012	38,289,136	72.40	14,590,298	1,972,237	12,604,655	—1,471,514
Midland Valley	383	2,188,647	616,194	2,927,127	581,771	398,969	35,899	921,342	102,817	2,040,799	69.72	886,328	97,403	788,312	230,907
Mineral Range	120	1,115,890	35,423	1,184,850	238,226	217,530	5,837	645,977	14,931	1,122,501	94.73	62,348	40,389	21,959	—148,047
Minn. & St. Louis	1,646	8,332,446	1,952,182	11,005,063	1,535,250	1,270,519	215,074	4,575,866	273,087	7,869,191	71.50	3,135,871	542,801	2,589,818	—606,261

*Began operation April 1, 1917.

*Began operation April 1, 1917.

REVENUES AND EXPENSES OF RAILWAYS

CALENDAR YEAR 1917—Continued

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
Minn., St. Paul & Sault Ste. Marie	4,227	$25,360,290	$6,545,723	$34,540,491	$3,776,557	$4,736,339	$567,917	$12,994,088	$775,261	$22,964,794	66.48	$11,575,698	$1,543,319	$10,029,664	—$3,719,416
Missouri & North Arkansas	365	861,919	455,649	1,417,969	242,710	231,448	46,676	541,308	65,424	1,122,310	79.14	295,659	67,764	225,963	9,624
Missouri, Kansas & Texas System	3,866	29,127,903	11,160,922	43,444,130	6,353,665	8,737,922	786,980	15,672,561	1,273,610	33,146,111	76.29	10,298,040	1,983,115	8,304,832	2,573,321
Mo., Okla & Gulf of Tex	71	255,815	6,025	265,153	24,496	22,808	17,341	81,368	15,376	161,414	60.87	103,739	2,204	101,522	72,883
Mobile & Ohio	1,160	11,263,406	1,586,293	13,604,506	1,424,371	3,266,114	454,761	4,818,612	389,605	10,352,977	76.09	3,251,530	685,859	2,562,513	—250,759
Monongahela	108	1,920,133	182,025	2,152,836	425,727	228,335	11,773	642,775	50,476	1,359,086	63.13	793,750	37,628	755,920	—176,235
Monongahela Connecting	5	.....	.....	2,010,970	362,064	320,582	4,236	982,563	51,871	1,721,317	85.59	289,653	30,322	259,331	269,305
Morgan's La. & Tex. R. R. & S. S. Co.	400	4,988,920	1,491,506	6,910,459	692,108	882,309	144,693	1,996,322	159,567	3,902,010	56.47	3,008,449	601,607	2,402,962	1,032,408
Nashville, Chattanooga & St. Louis	1,236	10,431,355	3,558,399	15,194,755	1,564,531	2,884,289	657,684	5,873,946	435,007	11,550,032	76.01	3,644,723	661,979	2,979,697	—441,964
Nevada Northern	165	2,264,821	186,588	2,512,402	247,071	265,822	9,918	475,322	68,398	1,067,865	50.46	1,444,537	123,674	1,320,862	129,007
New Orleans & North Eastern	203	3,537,502	980,753	4,969,264	483,991	858,592	123,493	1,691,655	135,429	3,339,505	67.20	1,629,759	416,994	1,211,535	2,667
New Orleans Grt. Nor	284	1,450,970	379,043	1,916,461	204,372	304,311	38,055	604,787	80,866	1,235,241	64.45	681,220	93,460	586,934	—130,645
New Orleans, Tex. & Mex	191	1,178,189	291,254	1,517,604	213,709	227,458	52,502	416,355	75,003	985,047	64.90	532,557	77,535	454,775	253,730
New York Cent	6,082	148,192,843	57,432,038	238,829,800	22,727,101	41,782,623	3,168,968	94,632,907	5,448,192	170,542,128	71.41	68,287,671	12,123,508	56,139,718	—14,471,897
New York, Chicago & St. Louis	571	14,731,021	1,408,249	16,901,206	1,379,715	2,707,764	560,845	8,153,812	426,829	13,281,309	78.58	3,619,897	607,912	3,011,759	—379,219
New York, N. H. & H	1,995	40,395,999	34,427,801	85,784,893	9,019,344	12,191,352	522,287	36,380,373	2,470,695	61,970,060	72.24	23,814,833	3,336,980	20,471,857	—2,577,180
New York, Ontario & Western	568	5,976,309	1,741,046	9,164,878	1,013,043	1,524,323	113,189	3,729,855	240,169	6,620,579	72.23	2,544,299	316,179	2,227,676	—97,060
New York, Philadelphia & Norfolk	112	4,238,697	801,272	5,516,810	484,491	1,042,864	61,994	2,288,869	130,989	4,088,262	74.10	1,428,548	276,653	1,151,404	—446,940
New York, Susquehanna & Western	135	2,525,630	597,841	3,478,993	313,721	423,362	27,140	1,931,940	69,723	2,764,362	79.45	714,631	152,962	561,043	—258,732
Norfolk & Western	2,085	56,381,036	7,023,153	65,910,242	6,176,369	12,051,912	809,723	20,808,290	1,217,101	41,161,503	62.45	24,748,739	5,095,000	19,651,816	—3,807,450
Nor. Pac.	6,521	65,258,995	15,646,778	88,225,726	10,782,178	11,245,120	1,233,124	28,531,413	1,635,779	53,297,861	60.41	34,927,865	7,495,693	27,423,035	—4,109,147
Northwestern Pacific	507	2,375,185	1,963,326	4,871,595	672,013	557,486	64,075	1,686,191	124,259	3,113,695	63.91	1,757,899	246,267	1,511,480	65,894
Panhandle & Santa Fe	689	5,458,563	1,139,391	6,890,859	877,926	1,165,563	57,153	1,932,697	158,049	4,166,650	60.46	2,724,209	876,381	1,845,877	—508,044
Pennsylvania Company	1,754	56,199,623	13,792,899	78,595,298	9,960,415	14,751,752	1,099,816	34,474,710	1,903,815	62,747,899	79.83	15,847,399	4,524,572	11,317,769	—9,002,966
Pennsylvania Railroad	4,543	176,927,084	52,938,945	255,093,495	29,610,653	52,612,430	2,850,787	104,934,728	6,409,932	200,588,086	78.63	54,505,409	10,199,823	44,264,408	—10,791,604
Peoria & Pekin Union	19	173,720	68,205	1,206,718	128,013	180,863	654	725,307	38,812	1,073,650	88.97	133,068	101,500	31,567	—116,191
Pere Marquette	2,248	13,103,152	3,281,498	18,232,648	2,048,689	2,520,405	335,803	7,251,030	489,955	12,681,448	69.55	5,551,200	526,620	5,024,532	89,992
Phila. & Reading	1,127	54,772,091	7,802,326	66,811,398	4,295,826	12,323,201	583,517	28,245,557	1,101,625	46,699,283	69.90	20,112,115	2,036,568	18,071,802	—5,744,561
Philadelphia, Baltimore & Washington	746	16,057,194	14,036,541	33,212,404	3,754,757	6,129,797	383,810	13,636,666	706,481	24,588,247	74.03	8,624,157	1,352,554	7,271,153	1,145,925
Pitts. & Lake Erie	224	21,139,925	2,349,133	25,621,654	2,893,048	4,795,678	194,455	8,254,964	452,138	16,652,502	64.99	8,969,152	1,400,550	7,568,576	—3,860,755
Pitts. & W. Va	63	1,102,088	93,533	1,289,883	103,882	173,724	17,322	397,688	56,347	785,276	60.88	504,607	88,846	415,762	*
Pittsburgh, Cincinnati, Chic. & St. Louis	2,398	51,423,799	14,053,621	73,507,628	8,160,800	14,900,162	1,270,563	29,708,708	1,737,778	56,361,949	76.67	17,145,679	3,197,138	13,946,948	—1,091,922
Pittsburgh, Shawmut & Northern	204	1,048,010	61,079	1,141,805	198,880	510,684	14,383	523,362	56,457	1,303,766	114.18	—161,961	19,747	—181,709	—434,610
Port Reading	21	1,655,652	.....	2,105,395	147,451	122,169	476	1,085,694	11,904	1,367,044	64.93	738,351	103,831	634,520	47,185
Rich., Fred. & Potomac	87	2,422,334	2,132,055	5,249,407	338,706	557,206	45,970	1,746,658	104,570	2,863,814	54.56	2,385,592	524,080	1,861,352	297,085
Rutland	454	2,388,555	1,281,565	4,325,369	499,895	698,823	123,593	1,837,628	101,255	3,275,722	75.73	1,049,646	253,654	795,833	—309,441
St. Jos. & Grd. Island	257	1,868,289	321,303	2,346,814	1,036,733	303,836	41,710	874,597	69,214	2,345,541	99.94	1,273	118,571	—117,544	—738,082
St. L. B. & Mexico	548	2,301,302	1,249,805	3,918,191	586,169	479,368	126,624	1,098,133	131,304	2,399,261	61.23	1,518,930	182,107	1,335,705	—226,409
St. L. M. Brdg. Terminal	9	.....	8,708	3,166,033	374,199	187,864	11,166	1,630,968	90,583	2,294,780	72.48	871,253	111,234	759,978	91,084
St. L.-San Fran	4,752	37,954,097	15,488,061	57,352,310	6,414,792	9,457,805	785,989	19,474,475	1,549,268	37,449,019	65.30	19,903,291	2,689,263	17,198,997	†
St. Louis-San Fran. & Tex	189	735,759	261,158	1,113,130	187,917	204,581	25,740	545,067	64,797	1,028,101	92.36	85,029	19,445	65,541	—51,479
San Ant. & Aran. Pass	732	2,852,218	1,023,733	4,178,192	709,237	658,989	86,901	1,901,094	168,851	3,517,594	84.18	660,597	194,947	464,404	—85,470
Seaboard	3,461	19,674,328	7,777,069	30,345,146	3,215,505	5,105,472	931,259	11,347,770	944,919	21,717,178	71.56	8,627,968	1,380,253	7,237,881	—191,117
Southern	6,982	58,450,039	24,303,183	90,716,569	9,244,833	14,656,481	1,996,342	31,797,038	2,195,295	60,113,598	66.26	30,602,971	4,143,861	26,429,962	2,962,627
Southern in Mississippi	278	756,042	436,329	1,309,222	245,859	107,612	27,131	544,812	51,402	976,816	74.61	332,405	114,836	217,331	38,950
Sou. Pac.	7,091	95,797,567	33,740,117	141,653,380	12,426,717	17,968,019	2,099,540	53,316,394	3,244,805	90,961,279	21.83	50,692,102	9,554,152	41,101,955	2,197,979
Spokane, Portland & Seattle	554	4,555,835	1,722,382	6,778,799	761,988	543,610	98,554	1,682,025	167,856	3,305,940	48.77	3,472,858	712,948	2,759,197	971,547
Tennessee Central	293	1,259,185	419,633	1,797,252	269,213	290,454	57,915	677,144	84,662	1,379,302	76.74	417,949	56,388	361,525	—19,534
Terminal R. R. Assn. of St. Louis	36	.....	18,875	3,712,529	525,141	261,664	11,820	1,222,383	76,503	2,122,111	57.16	1,590,417	421,229	1,169,153	—349,592
Texarkana & Ft. Smith	81	885,982	152,319	1,136,522	94,196	58,733	32,800	346,390	43,782	570,855	50.22	565,667	103,746	461,207	92,105
Texas & Pacific	1,946	14,933,635	6,252,827	22,714,007	2,036,463	2,999,166	477,450	9,022,788	722,082	15,389,755	67.75	7,324,252	1,240,049	6,074,888	544,790
Tex. New Orleans	468	4,393,703	1,482,750	6,410,077	556,176	953,056	107,114	1,973,682	137,331	3,900,757	60.85	2,509,320	507,564	1,997,987	866,620
Toledo & Ohio Cent	435	6,868,768	691,119	8,088,541	1,035,569	1,468,680	99,451	3,356,445	131,233	6,114,305	75.59	1,974,237	373,198	1,600,952	307,782
Toledo, Peoria & Western	247	768,110	423,086	1,289,433	215,527	361,745	28,261	522,514	57,023	1,184,774	91.88	104,659	107,003	—2,345	—113,840
Toledo, St. Louis & Western	455	6,244,027	466,508	7,041,663	1,082,020	1,117,667	222,194	2,486,590	118,714	5,023,863	71.34	2,017,800	319,300	1,697,658	—200,664
Ulster & Del	128	498,311	299,584	1,008,893	96,102	132,551	19,235	494,576	50,939	797,475	79.04	211,418	55,192	156,480	—55,189
Union Pac.	3,622	55,839,584	13,918,940	76,988,423	8,930,175	10,065,284	1,367,957	22,308,566	2,153,758	45,938,666	59.67	31,049,757	3,520,257	25,521,423	—2,791,041
Union R. R. of Baltimore	8	1,496,219	483,736	2,006,579	103,595	.....	.....	96,176	25,623	225,383	11.23	1,781,196	418,393	1,362,803	—265,308
Union R. R. of Penna	35	.....	.....	5,732,626	469,776	2,035,021	3,858	3,111,654	80,728	5,699,962	99.42	32,664	70,569	—37,905	—1,529,588
Vicksburg, Shreveport & Pacific	171	1,323,396	641,903	2,206,558	275,481	371,230	61,752	660,937	69,730	1,397,315	63.32	809,243	184,398	624,138	147,753
Virginian	512	9,064,503	564,777	10,242,473	800,852	1,608,197	71,645	2,839,328	191,872	5,698,862	55.63	4,543,611	571,500	3,972,080	171,524
Wabash	2,519	29,342,855	7,673,810	40,471,999	3,961,075	5,466,120	1,039,212	16,888,331	918,040	28,468,896	70.34	12,003,103	1,453,593	10,543,882	—1,127,567
Wash. Sou.	35	804,303	1,322,846	2,763,407	164,701	256,286	17,634	846,042	46,516	1,362,023	49.29	1,401,384	252,447	1,148,911	425,444
West Jersey & Seashore	359	2,730,912	5,116,018	8,555,048	1,496,111	1,315,978	136,947	3,786,947	211,217	7,002,130	81.89	1,552,917	511,818	1,040,803	—371,381
Western Md.	739	11,632,162	1,089,687	13,638,450	1,460,107	2,605,149	272,363	4,721,023	346,355	9,561,316	70.10	4,077,134	524,607	3,552,499	—493,175
Western Pacific	960	7,968,721	1,473,538	9,898,484	1,577,090	999,073	254,562	2,993,342	274,312	6,190,055	62.53	3,708,428	492,297	3,215,936	273,347
West. Ry. of Ala	133	900,776	577,355	1,723,860	208,517	330,668	77,992	540,423	57,488	1,241,846	72.03	484,014	121,142	362,751	42,113
Wheeling & Lake Erie	512	9,438,249	630,606	11,028,904	1,396,912	1,677,581	115,749	3,905,022	249,436	7,369,085	66.81	3,659,819	604,387	3,055,404	—22,007

*Began operation April 1, 1917.
†Began operation November 1, 1916.

Railway Regiments' Tobacco Fund

During the past week one new subscription to the Railway Regiments' Tobacco Fund for $10 a month for 12 months was received from the Rome Iron Mills, Inc., New York; a donation of $20 was made by the McConway & Torley Company of Pittsburgh, and a second contribution of $100 was received from the Chicago Railway Equipment Company, Chicago.

American Institute of Consulting Engineers

The Council of the American Institute of Consulting Engineers, on February 19, elected the following officers for the ensuing year: President, Lewis B. Stillwell; vice-president, Alexander C. Humphreys; secretary and treasurer, F. A. Molitor (35 Nassau street, New York). The new members of the Council elected at the annual meeting are J. Vipond Davies, P. W. Henry and C. M. Ingersoll.

The Northern Pacific "Careful Club"

The Bureau of Efficiency of the Northern Pacific has adopted a new plan to secure the co-operation of employees in accident prevention. It has organized a "Careful Club." All employees and their families are eligible for membership, which they may secure by accepting a four-colored emblem bearing the Northern Pacific trade mark and the words "Careful Club, Northern Pacific." The emblem is in the form of a lapel button for men and a bar pin, with the added words "Ladies' Auxiliary," for women.

With the emblem each member is handed a card on which is printed: "Having hereby become a member of the Northern Pacific Careful Club, I wear as a token this N. P. emblem to remind me that as our lives and limbs are priceless it is my duty to myself, to my family, to my employer and to my nation to avoid all risks; and my duty to my fellowmen is to induce him to do likewise. This duty I will faithfully strive to perform."

Conference on Railroad Fuel Coal

A general conference on questions arising in connection with the supply of fuel coal to railroads, called by the United States Fuel Administration, was held at Washington on March 1. Representatives of coal mine operators, eastern railroads, the office of the Director General of Railroads, and the Fuel Administration attended. The conference was purely advisory. It selected W. K. Fields, president of the National Coal Association, as chairman, and began a general discussion of recommendations to the Director General of Railroads and the Fuel Administration designed to secure the following results:

1. To provide a definite and dependable supply of good fuel for the railroads.
2. To avoid excessive use of transportation in obtaining railroad fuel.
3. To retain for other uses some coals of special quality which are now being used as railroad fuel.
4. To so distribute railroad fuel in connection with all other distribution as to obtain as nearly as possible equal running time for all mines. A committee was named consisting of one member from each of the railroads represented in the conference and one member representing each of the coal districts present, which should consider the questions they had been called to discuss and report to the conference.

The railroads appointed the following committeemen; Delaware & Hudson, J. White Sprong; New York Central, S. B. Wight; Erie, W. R. Collins; N. Y., Ontario & Western, Chas. A. Draper; Norfolk & Western, Geo. Dunglinson, Jr.; Lehigh Valley, F. L. Blendinger; Bangor & Aroostook and Boston & Maine, Frank C. Wright; Pennsylvania and Long Island, C. M. Sheaffer; Delaware, Lackawanna & Western, C. C. Hubbell; Canadian Northern, H. T. Rawlings; Central of New Jersey, J. F. Hinterleiter; Chesapeake & Ohio, D. T. Jellison; Baltimore & Ohio, W. L. Robinson; N. Y., N. H. & H., George G. Yeomans; Philadelphia & Reading, E. B. Crosley. The committee adjourned to meet again on Friday, March 8.

Traffic News

The Kansas Public Utilities Commission in a decision handed down on February 20, denied the application of the railroads of that state for an increase in freight rates of 20 per cent.

Sixty ships are now engaged in carrying coal to New England, and shipments of bituminous coal for factories in that territory are being largely increased. While New England is behind in its normal supply, there is now a gradual revival in industries which were affected by the shortage.

The Adams Express Company has announced this week an embargo on all carload shipments, and on all pieces of freight weighing more than 300 lb. each, throughout the territory east of Chicago and St. Louis, and north of the Potomac and Ohio rivers. Government shipments, food products, and a few other things are excepted.

Figures showing that nearly 50 per cent more grain has been hauled to western primary markets during the last three weeks than in the same period of last year have been made public by the Railroad Administration. In spite of this, however, the reserve of grain in elevators of western primary markets is now only one-third of that of a year ago.

According to reports made by the Milwaukee (Wis.) committee of the Commission on Car Service, the average weight per car of merchandise loaded in Milwaukee during January, 1918, was 16,428 lb., as compared with 11,597 lb. in 1917, or an increase of 4,831 lb., effecting a saving of 3,756 cars. The total number of cars loaded in January, 1918, however, was less than half the total of January, 1917, the decrease in tonnage being 27,620,863 lb.

While Chicago and the entire East have had a siege of snow and cold weather this winter, the weather along the Union Pacific in Wyoming has been mild, says the company's monthly bulletin for February. On February 4 the thermometer at Cheyenne, Wyo., registered 61, and an Omaha newspaper had an article headed "Go to Wyoming, the Land of Fruit and Flowers, the Popular Winter Resort." The Union Pacific spent a million dollars last year for steel and concrete snow sheds in Wyoming but they have proved unnecessary this winter.

General William W. Wotherspoon, superintendent of public works of the state of New York, discussing ways and means for utilizing the barge canal from Lake Erie to the Hudson river, which is to be ready for use on May 15, recommends the building of barges 150 ft. long, and 20 ft. 4.5 in. wide, with a draught of 8 ft. 6 in. or 9 ft. Such a barge could carry 600 tons. For the present the size of vessel which can be used on the canal for through traffic to New York City will be limited by the lock in the Hudson river, between Troy and Albany, which is only 44 ft. wide, 10 ft. deep and about 310 ft. long. A barge of 2,800 tons could pass through this lock, but General Wotherspoon doubts the commercial practicability of so large a vessel. With a supply of vessels of the smaller size suggested he would have them run in fleets of four. With one of the four equipped with power, the fleet could pass through the locks at one time.

The proposal for a special charge to cover the switching service performed by railroads on private and industrial sidings has been revised by the Railroad Administration and is arousing shippers throughout the country. While there has been no announcement, a tentative plan has been drawn by the traffic department of the Railway Administration, which provides for a charge of $2 a car for placing the loaded cars on a private siding, or taking a loaded car from the siding; $1 per car for spotting a car at a particular location on the siding, and $2 per car for interplant switching. It has been estimated that these charges would increase the revenues by $176,000,000, but shippers have made estimates much higher. The Railroad Administration is also making efforts to expedite the work of compiling a uniform classification of freight. Members of the three classification com-

mittees, together with a representative of the Interstate Commerce Commission, are at work in Chicago at the request of the Interstate Commerce Commission in an effort to submit a report for early consideration.

Through the Hudson Terminal of the Hudson & Manhattan Railroad, Church and Cortland streets, New York City, there pass annually about 17,000,000 passengers to or from stations on the Pennsylvania Railroad, which is an increase of more than 50 per cent over the number thus using the station in 1911, the year in which the Hudson & Manhattan and the Pennsylvania began their joint service of electric passenger trains between Church street, New York, and Park Place, Newark. These figures are given in a statement by Samuel Rea, president of the Pennsylvania Railroad, explaining the use of the tube terminal as a passenger terminal of the Pennsylvania Railroad. He calls attention to the fact that this terminal was so used for two years before the Pennsylvania station at Thirty-second street was opened. Passengers began using the "Hudson Tubes," in place of the ferry boats, as soon as the tubes were opened, transferring to and from the Pennsylvania trains at the old station of that road in Jersey City. Transfers from electric to steam trains, and steam to electric, are now made at Manhattan Transfer, eight miles west of Jersey City.

Freight Congestion at Atlantic Ports

Regional-director A. H. Smith reports that on March 1, the freight on hand at the six North Atlantic ports awaiting shipment by ocean vessels amounted to 30,719 carloads, as compared with 33,595 cars on February 1. The decrease at New York was 3,249 carloads, but there were increases at Baltimore and Philadelphia. Of the total freight on hand March 1, the amount in cars was 7,018 carloads; on piers or in warehouses, 7,000 carloads, and on the ground, 16,701 carloads. Since January 1, the decrease in the total has been about 25 per cent.

Joint City Ticket Office at Washington

City ticket offices of seven railroads in Washington are to be combined in a single union ticket office, in a central location, by order of the Railroad Administration. Committees of the various territorial passenger associations are considering plans for similar changes in other cities, but it was decided to make the first move of this kind at Washington. The offices to be combined are those of the Baltimore & Ohio, which has two offices, the Pennsylvania, the Southern, the Norfolk & Western, the Chesapeake & Ohio, the Seaboard Air Line and the Atlantic Coast Line. A considerable saving in rentals will be made besides releasing valuable space for other purposes, but the total saving will be only about half the amount of the reduction in rentals because it is expected to make some increases in salaries. The new office is to be opened about May 1.

Aerial Postal Service

The Post Office Department has announced that the proposed aerial postal service between Washington, Philadelphia and New York is to begin not later than April 15. By arrangement with the War Department, the postal route will be conducted for one year as a part of the aeronautic training service of the War Department and the War Department will provide the aeroplanes for the service. One trip each way will be made daily, except Sunday, on a regular schedule. Not to exceed 300 pounds of first class mail, occupying a space of not more than 25 cubic feet, will be carried each trip. It is proposed to issue 24-cent stamps, to be used on letters by airplane, their function being similar to that of a ten-cent special delivery stamp; thus making the cost of a one-ounce letter 27 cents. It is expected that the trip between Washington and New York, including a stop at Philadelphia, will be made inside of three hours. In New York the proposed landing places are several miles from the main post office.

EXPORTS FROM THE PORT OF NEW YORK during the month of January, 1918, according to a compilation of the National City Bank of New York, included steam locomotives valued at $1,025,139, freight cars at $888,244, and rails at $670,040.

Commission and Court News

Interstate Commerce Commission

E. L. Bevington, J. E. Hannegan and E. E. MacLeod have filed fifteenth section applications with the Interstate Commerce Commission for permission to file tariffs increasing the rates for the movement of special baggage cars and special passenger cars and making a change in the rules governing the combination movement of special baggage and passenger cars and special trains between Colorado common points, Ogden and Salt Lake City, Pacific Coast points and Chicago, Missouri river, and Mississippi river points, and Texas and New Mexico points. The proposed basis is 12½ fares or 30 cents a mile with a minimum of $25 a car for special baggage cars and 25 fares with a minimum charge of $25 for special passenger cars.

Court News

Limitation of Liability

In an action against an express company for the loss of a trunk, the New York Appellate Division holds that although the shipper's servant who delivered the trunk and took a receipt for it was illiterate, the liability of the defendant was limited by the amount stated in its receipt, where the amount paid for transportation entitled the shipper only to such amount under the filed tariffs, the shipper being charged with notice of filed tariffs, which are terms of the contract.—Kolb v. Taylor, 168 N. Y. Supp., 685. Decided January 17, 1918.

Grant of Perpetual Right to Use Streets

The Louisiana Supreme Court holds that by the terms of Act No. 79 of 1896, p. 113, the governing authorities of towns or cities having less than 25,000 inhabitants have no authority to grant to a railroad company a perpetual or irrevocable right to use or occupy any street in the municipality, unless the grant be approved by a majority of the property taxpayers in the municipality voting at an election called for that purpose.—Louisiana Western v. Crowley (La.), 77 So., 486. Decided November 26, 1917. Rehearing denied January 3, 1918.

Heating Waiting Rooms

Section 784 of the Kentucky Statutes requires ticket offices to be open 30 minutes before time of departure of passenger trains and until the trains depart. Section 772 requires proper waiting rooms, properly lighted and heated. In a prosecution for violation of section 772, the Kentucky Court of Appeals holds that under these sections railroads are not required to keep their waiting rooms suitably heated or ventilated during the whole day, or at any other time except the time provided by section 784.—Illinois Central v. Commonwealth (Ky.), 200 S. W., 17. Decided January 29, 1918.

Crossing Accidents—Contributory Negligence

The California Supreme Court holds that the driver of an automobile damaged in a collision with a train at a crossing was negligent, barring recovery, in not getting out and looking up the track, although no whistle was blown nor bell rung. He was driving on the left-hand side of the roadway, on which side a building obstructed his view of the track, and he was well acquainted with the dangerous conditions and knew that several accidents had occurred there.—Murray v. Southern Pacific (Cal.), 169 Pac., 675. Decided December 18, 1917.

The California District Court of Appeals for the Second District holds that an automobile driver, familiar with a railroad crossing, where the view was somewhat obstructed, could have stopped a safe distance from the track, stilled the noise of the automobile engine and listened for an approach-

ing train; but he failed to do so and was, as matter of law, guilty of contributory negligence, barring recovery for injury to the automobile.—Rayhill v. Southern Pacific (Cal.), 169 Pac., 718. Decided November 8, 1917.

State Commission's Approval of Switching Rates

The Illinois Supreme Court holds that, under section 36 of the Public Utilities Act, declaring that no public utility shall increase any rate or other charge or so alter any classification, practice, or regulation as to result in any increase in rate, except on a showing before the commission, the increase of switching charges by a rule which defines a side track as a team track is improper, where the previous charges had been imposed for many years. Although it was conceded that the fact that an unreasonably low rate had been charged for a long term of years would not prevent the railroad from making a reasonable charge, still the statute does prevent doing it without the commission's approval. —Commission v. C. P. & St. L. (Ill.), 118 N. E., 427. Decided December 19, 1917. Rehearing denied February 7, 1918.

Stipulation as to Claim for Damages

The Massachusetts Supreme Judicial Court holds that the stipulation of a contract for an interstate shipment of horses requiring claim for damages to be in writing, verified by the shipper and delivered to the carrier's agent within five days of the time of the removal of an injured horse from the car, was reasonable. A station agent cannot bind the railroad by admissions in effect substituting a new agreement as to such a shipment in place of the agreement of the railroad and shipper, and depriving the railroad of the requirements of the written contract between it and the shipper. It is also held that a contract covering a shipment of horses was not defective because unfilled and incomplete in certain places, among them omitting the name of the shipper from the heading, reading: "This agreement made this * * * day of 10-2-1912 and by and between the Boston & Maine Railroad, hereinafter called the carrier, and * * * hereinafter called the shipper," etc.—Fletcher v. N. Y. Cent. & H. R. (Mass.), 118 N. E., 294. Decided January 14, 1918.

Federal Employers' Liability Act— Limitation of Time for Action

The New York Supreme Court, Special Term, Steuben County, holds that under the federal Employers' Liability Act, § 6, providing that no action shall be maintained under the act unless commenced within two years from the day the cause of action accrued, where plaintiff's intestate was killed in service in 1909, and she brought action under the state statutes, later amending to set up the federal Employers' Liability Act, which action finally resulted in dismissal of her complaint, on the ground that she had failed to show her intestate was engaged in interstate commerce at the time of the accident, she was not entitled to bring a new action in 1917, under the federal Employers' Liability Act, though within a year after the decision of the Court of Appeals affirming the judgment dismissing her complaint in the former action, despite New York Code Civ. Proc., § 405, substantially providing that when an action is commenced in due time, and plaintiff fails otherwise than upon the merits, a new action can be commenced within one year.—Norton v. Erie, 167 N. Y., Supp. 177. Decided November 12, 1917.

Rival Claims to Goods

The Minnesota Supreme Court holds that where on arrival at destination property is demanded from a carrier by the consignee and also by an adverse claimant, the carrier is entitled to a reasonable time for investigation, on its request therefor, before an action will lie against it. Where the adverse claimant claimed no rights under the contract of shipment and made no claim to the property until after it had arrived at its destination, the carrier owed to him only the duties of a bailee or warehouseman and might relieve itself from liability by showing that without fault or negligence on its part it was unable to produce or deliver the property. In an action of replevin by the adverse claimant the defendant carrier interposed both the above defenses, and they were excluded at the trial. Verdict was given for the plaintiff, and from an order denying a new trial the defendant appealed. It was held that the defenses were erroneously excluded, and as the record showed conclusively that the defendant did not waive them, a new trial was ordered.—Taylor v. Duluth, S. S. & A. (Minn.), 166 N. W., 128. Decided January 18, 1918.

Cases Under the Federal Employers' Liability Act

Where a railroad, whose tracks were wholly within the state, maintained a private spur track at the owner's expense, over which it moved freight cars from its station to the owner's premises, the New York Appellate Division holds that a laborer, injured while repairing the spur track, was not engaged in interstate commerce, notwithstanding that the railroad sometimes moved interstate freight over the track.—Liberti v. Staten Island, 167 N. T., Supp. 478.

The New York Appellate Division holds that a carpenter employed in repairing coal chutes through which coal passed to interstate locomotives was not engaged in interstate commerce.—Gallagher v. N. Y. C., 167 N. Y., Supp. 480.

The Indiana Appellate Court holds, following N. Y. C. v. Winfield (1917), 244 U. S. 147, and Erie v. Winfield (1917), 244, U. S. 170, that if a railroad employee is engaged in interstate commerce when accidentally injured without negligence of the employer, he cannot recover under the state Workmen's Compensation Act, though the railroad company is not liable under the federal Employers' Liability Act. A flagman killed by an automobile while he was diagonally crossing the intersection of the defendant railroad's track to get his lantern or flag was held to be engaged in interstate commerce depriving the state industrial board of jurisdiction. Walker v. C., I. & L. (Ind.), 117 N. E., 969.

The New Jersey Court of Errors and Appeals holds that under the federal Employers' Liability Act, relieving the employer from liability for injury to an employee arising out of risks assumed by the employee, a railroad employee injured by reason of an obvious risk fully appreciated by him was injured by an assumed risk and could not recover. Capan v. D., L. & W. (N. J.), 102 Atl., 661.

Refusal of Mileage Book Coupons by Foreign Road

In an action for damages for misrepresentation in the sale of mileage transportation tickets it appeared that on April 3, 1914, the plaintiff telephoned to the agent of the defendant, the Alabama Great Southern, at Bessemer, that he wanted transportation from Bessemer to Shreveport, La. Before the train was due the plaintiff went to the ticket office and the agent delivered to him a book containing mileage coupons, form S. I. M., and a ticket from Bessemer to Shreveport, the agent tearing out of the book coupons to pay for such ticket; and the plaintiff signed the contract printed on the outside of the mileage book. The ticket routed the plaintiff over the defendant's road and over the Vicksburg, Shreveport & Pacific to Shreveport. There was stamped on the face of the contract signed by the plaintiff in large red letters that coupons would not be accepted on trains or for transportation over the V. S. & P. after March 1, 1914. Under tariff duly filed with the Interstate Commerce Commission by the defendant and other roads it was provided that the V. S. & P. would not honor coupon mileage tickets, form S. I. M. Desiring to return to Bessemer the plaintiff presented to the ticket agent of the V. S. & P. the mileage book and demanded a ticket in exchange for mileage coupons. This was refused; the plaintiff took passage on the V. S. & P.'s train and was ejected by the conductor for refusal to pay fare. The plaintiff brought action for damages for the defendant's agent's wrongful representation that the mileage transportation was good over the V. S. & P. on his return trip. The Alabama Court of Appeals held that as the contract was strictly in conformity with the regulations and tariff filed with the Commission, it was binding on the plaintiff, and the defendant was not liable for the agent's statement that the coupons were good for return transportation over the V. S. & P.—Alabama Great Southern v. Vermillion (Ala.), 77 So., 67. Decided November 13, 1917.

Equipment and Supplies

Locomotives

THE CANADIAN GOVERNMENT RAILWAYS have ordered from the Canadian Locomotive Company 6 six-wheel switching locomotives and 4 ten-wheel narrow gage locomotives, the latter four for the Prince Edward Island Railway. Delivery is specified for June.

Freight Cars

CIO ANFALDO & CO. are inquiring for 300 tank cars.

THE CANADIAN GOVERNMENT RAILWAYS are inquiring for 5,000 40-ton box cars.

FELS & CO., Philadelphia, are inquiring for a number of 8,000- to 10,000-gal. tank cars.

THE PURE OIL COMPANY, Minneapolis, Minn., is inquiring for 30 steel underframe tank cars.

THE UNITED STATES GOVERNMENT has ordered for use on military railroads in France in addition to the 3,500 recently reported, 500 low side gondola cars from the Haskell & Barker Car Company and 375 high side gondolas and 200 box cars from the Standard Steel Car Company.

Miscellaneous

FOREIGN TRADE OPPORTUNITIES.—Commerce Reports, published daily by the Bureau of Foreign and Domestic Commerce of the Department of Commerce, contain in recent issues the following trade opportunities:

26540.†—The professor of railway engineering of a college of engineering and mining in Peru desires to receive illustrated catalogues from American manufacturers and exporters of railway equipment, etc., these catalogues to be used in connection with his classes in railway engineering; also sanitary supplies and equipment.

26558.†—An agency is desired by a man in France for the sale of railway construction materials. Correspondence should be in French. References.

26559.*—A company in India desires to secure an exclusive agency for the sale of light railway material. Payment will be made by 60-days' rupee drafts, documents against acceptance. Correspondence may be in English. References.

Reserved addresses may be obtained from the bureau and its district and co-operative offices. Request for each opportunity should be on a separate sheet and state opportunity number. The Bureau does not furnish credit ratings or assume responsibility as to the standing of foreign inquirers; the usual precautions should be taken in all cases. Symbols: *Reported by American consular officers; †Reported by commercial attachés and commercial agents; ‡Direct inquiries received by the Bureau.

Signaling

THE LOUISVILLE & NASHVILLE is making extensive additions to its Union electric interlocking plants at Louisville, Ky., and Amqui, Tenn.

THE MISSOURI PACIFIC has ordered from the Union Switch & Signal company an interlocking machine, 20 levers, to be installed in the place of an old machine at Halsey, Ill.

THE MISSOURI, KANSAS & TEXAS has ordered from the Union Switch & Signal Company material for a twelve-lever interlocking at Clinton, Mo., at the crossing of the St. Louis-San Francisco.

THE YAZOO & MISSISSIPPI VALLEY has ordered from the Union Switch & Signal Company material for a mechanical interlocking at Baton Rouge, La., 21 working levers.

Supply Trade News

A. J. Beuter, representative of the Baldwin Locomotive Works at San Francisco, Cal., has been transferred to Portland, Ore.

The Bettendorf Company has waived its patent rights on truck sides and underframes for the duration of the government control of the railroads.

F. H. Bird, traveling engineer for the American Steel Foundries, Chicago, has been commissioned a first lieutenant in the Ordnance Department of the U. S. Army.

W. I. Seigle, a member of the board of directors of the H. W. Johns-Manville Company, New York City, was elected vice-president at a recent meeting of the board. **William T. Klauss** was elected a director to succeed Mr. Seigle.

Ernest Baxter, general storekeeper of the Wabash, with office at St. Louis, Mo., has resigned to become manager of railroad sales for the Kansas City Bolt & Nut Company, with office in Kansas City, Mo., effective March 1. A photograph and biographical sketch of Mr. Baxter appeared on page 1128 of the issue of the *Railway Age Gazette*, for May 25, 1917.

W. D. Horton, circulation manager of the Simmons-Boardman Publishing Company, publishers of the *Railway Age*, has resigned to accept a position as district railway sales manager of the Patton Paint Company with headquarters at Milwaukee, Wis., effective March 1. Mr. Horton was born in Brooklyn, N. Y., December 3, 1880 and was educated in the public schools of that city. On June 1, 1908 (at the time of the consolidation of the *Railway Age* and the Railroad Gazette) he joined its staff and from 1908 to 1914 acted as traveling subscription representative, on April 1, 1914 being appointed circulation manager. Mr. Horton has had a wide selling experience, having spent several years, previous to 1908, selling various commodities such as stationary engines, boilers, wood-working and other machinery. In this work he travelled extensively throughout the United States, Canada, Mexico, Cuba, the West Indies, and in South and Central America. As circulation manager, he obtained a wide personal acquaintance among executive officers and department heads of nearly all the railways in the United States and Canada.

W. D. Horton

R. S. Cooper, who for several years has been in charge of the New York office of the Independent Pneumatic Tool Company, Chicago, has been elected vice-president and general sales manager with headquarters in the Thor building, Chicago. **R. T. Scott**, who has been in charge of the Pittsburgh office, succeeds Mr. Cooper at New York, and **H. F. Finney** succeeds Mr. Scott at Pittsburgh.

H. J. Tierney, president of the Tierney Supply & Lumber Company, Chicago, has been appointed representative for the Grip Nut Company, Chicago, with office at 1742 Railway Exchange building, St. Louis, Mo. Mr. Tierney began railway service with the Missouri, Kansas & Texas, on March 5, 1888, as apprentice coppersmith. He was appointed mechanical engineer in 1907, and was promoted to superintendent of

the car department in January, 1916, with headquarters at Denison, Tex., which position he resigned on January 1, 1918, to become president of the Tierney Supply & Lumber Company.

Interstate Iron & Steel Company

The annual report of the Interstate Iron & Steel Company, Chicago, for the year ended December 31, 1917, shows net earnings of $989,028, after the deduction of $61,659 for dividends on preferred stock, the payment of all operating expenses, taxes and fixed charges and after ample provision for depreciation and preferred stock sinking fund requirements. This net return is equal to 24.7 per cent on the outstanding common stock. However, no dividends were distributed on the common shares this year for reasons outlined by S. J. Llewellyn, the president, as follows:

"In normal times a substantial dividend upon the common stock would be justified. However, in view of the extremely unsettled financial conditions and the unknown factors of the business situation throughout the world your directors believe that it is to the best interests of the stockholders to conserve the cash resources of the company so as to adequately meet any unforeseen demands, rather than to pay a dividend at this time."

The company's balance sheet for the last fiscal year is as follows:

Assets			
Plant and Goodwill:			
As at January 1, 1917		$5,492,931.46	
Additions during year		871,434.93	
		$6,364,366.39	
Deduct:			
Depreciation reserve	$523,978.18		
Proportion of abnormal cost of construction during 1917 written off	44,450.00	568,428.18	$5,795,938.21
Current Assets:			
Inventory		$1,813,608.48	
Accounts and bills receivable less reserve		1,082,403.67	
U. S. Liberty Loan Bonds—4's	$475,000.00		
U. S. Treasury Certificates—4's	500.000.00	975,000.00	
Cash in banks and on hand		210,431.86	4,081,444.01
Deferred Charges:			
Insurance, interest, etc			8,617.00
Total assets			$9,885,999.22
Liabilities			
Capital Liabilities:			
Preferred stock—7% Cumulative			$866,600.00
Common stock—authorized and issued			4,000,000.00
First mortgage 6% bonds			2,189,000.00
			$7,055,600.00
Current Liabilities:			
Accounts payable and payrolls accrued		$402,487.33	
Reserve for accident liability		25,342.92	
General taxes and interest accrued		48,139.99	
Provision for Federal income and war excess profits tax		700.000.00	1,175,970.24
Reserves:			
Relining open hearth furnaces		$24,505.13	
Special inventory reserve		128,156.65	
Preferred stock sinking fund		50,000.00	
For contingencies		300,000.00	502,661.78
Surplus:			
Adjusted balance January 1, 1917		$162,739.29	
Surplus net income for year ending December 31, 1917		1,050,686.75	
		$1,213,426.04	
Deduct—Dividends paid on preferred stock		61,658.84	1,151,767.20
Total liabilities			$9,885,999.22

American Steel Foundries

The American Steel Foundries found the fiscal year ended December 31, 1917, the greatest in the company's history. The gross sales for the year were $49,369,584, as compared with $31,361,006 for 1916. The earnings from operations, after deducting all manufacturing, selling, administrative, and head and district offices expenses, and adding miscellaneous income, were $8,956,321, as compared with $4,965,224 in 1916. Taking out $917,646 for depreciation, $219,235 for interest charges, and $2,287,600 for Federal taxes, there were net profits before bond redemption and debenture retirement of $5,531,839.

Dividends of 1¼ per cent each were paid in the first and second quarters of the year, and of 1¾ per cent in the third and fourth quarters, involving a total payment of $1,031,040. Of the balance of the net earnings $197,251 went into additions to property; $1,787,378 to reduction of bonded indebtedness (including debentures); and $2,604,293 to increase in working capital, which at the end of the year was $9,895,421. The surplus increased during the year $2,777,558, and now stands at $6,429,228.

President R. P. Lamont in his report comments on the present situation as follows: "The year 1918 starts out badly. The operations for January were seriously curtailed by extraordinarily bad weather, railroad embargoes, and forced shutdowns on account of the coal situation, though we had plenty of coal and oil to run without interruption. February was also unsatisfactory, and it is certain that the first quarter of the year will not compare favorably with the same quarter last year. However, we have a large tonnage ahead of the Foundries which will keep us busy for six months at least. The miscellaneous business holds up particularly well, and sooner or later the railroads will have to come into the market; a great deal depends upon when they do, but with the large and constantly increasing shortage of equipment it seems certain that as soon as the necessary machinery is provided at Washington, the roads must buy large numbers of both cars and locomotives. We have a considerable volume of government work on our books; the margin of profit is small, but it will increase the volume of our business and help to carry overhead. We expect on the whole a satisfactory year."

The balance sheet follows:

Assets		
Real estate, buildings, plant, machinery, tools, equipment, patents and good will	$20,480,727	
Real estate not used for business purposes	298,630	$20,779,358
Miscellaneous securities	$1,192,098	
Inventories	7,352,854	
Accounts and bills receivable (less reserves)	8,608,865	
Cash	825,308	17,979,125
Deferred charges to operations		226,391
		$38,984,873
Liabilities		
Capital stock		$17,184,000
Four per cent debentures		1,716,800
Notes payable to banks	$3,125,000	
Accounts payable and payrolls accrued	2,694,690	
Provision for war excess profits, income and other taxes	2,461,791	
Accrued interest on debentures	28,613	8,310,094
Reserves for:		
Furnace rebuilding and metal flask renewals	273,866	
Workmen's compensation	101,482	375,348
Appropriated surplus:		
Bond sinking fund reserves	$3,249,403	
Debenture retirement reserve	1,720,000	4,969,403
Undivided surplus		6,429,228
		$38,984,873

Trade Publications

NEW YORK CONNECTING RAILROAD.—The Lehigh Portland Cement Company, Allentown, Pa., has issued two companion pamphlets describing this monumental work on which 600,000 bbl. of Lehigh Portland Cement was used. One of these contains a brief description of the construction of this line with special reference to the masonry work and is illustrated by maps. The second is a folder of colored illustrations showing the Hell Gate bridge section of this line in panoramic views and detailed illustrations of various portions of the masonry work.

JAPAN'S FUEL PROBLEM.—Anthracite coal in Tokio has been raised from 7 to 18 yen ($3.50 to $9) per ton. One of the causes attributed by coal dealers to the increased prices was the lack of space in the transportation of coal by the railways and shipowners, while at the coal mines and the provincial coal depots, stock is being accumulated to the annoyance of mine operators. The output of the collieries is increasing, but it is yet out of keeping with the demand of the market. The growing decline in the visible stock is mostly due to the overtaxed railways, resulting in the increase of prices.

Financial and Construction

Railway Financial News

CHICAGO, MILWAUKEE & ST. PAUL.—The directors met on February 28, but again took no action regarding the regular semi-annual dividends on both the common and the preferred stock. The question of declaring these dividends was indefinitely deferred at the regular meeting held January 25 last.

DENVER & RIO GRANDE.—E. L. Brown, president and a co-receiver recently appointed by the court, has resigned as co-receiver, and the court has designated Alexander R. Baldwin to act as sole receiver of the company's free assets. He will have no jurisdiction over operations. This change in the status of the receivership was made to segregate the operations of the property from the receivership. In receivership the courts would be called upon to operate the property, which eliminated the control of its operation by Director-General of Railroads William G. McAdoo. The new arrangement will continue the operations of the property under control of the Director-General and retain only the free assets under the jurisdiction of the court.

FT. SMITH, SUBIACO & EASTERN.—In a suit in equity by the St. Louis Union Trust Company to foreclose a mortgage on the Ft. Smith, Subiaco & Eastern, the United States District Court of the Western District of Arkansas issued an order appointing I. H. Nakdimen and Charles H. Sommer receivers of this road, which operates between Fort Smith, Ark., and Scranton, a distance of 14 miles.

ILLINOIS CENTRAL.—This company has notified its stockholders that it has discontinued the practice of sending them a monthly statement of its earnings. This action is taken on the ground that Federal control has so mingled the operations of all roads that a monthly earning statement would be of little or no value to the security holders.

PENNSYLVANIA RAILROAD.—See comments on annual report elsewhere in this issue.

PITTSBURGH & LAKE ERIE.—Col. J. M. Schoonmaker has been elected chairman of the board of directors, a newly created office.

Railway Construction

DELAWARE, LACKAWANNA & WESTERN.—This company is making plans to carry out improvements, including grading and relocation of tracks in the freight yards at Binghamton, N. Y. The work involves the handling of 300,000 cu. yd. of earth fill. Bids for the work will probably be asked for in the near future.

ERIE.—Plans have been made by this company to build a steel bridge with concrete floor about 70 ft. long and 61 ft. wide, over the tracks at Rochester. The new bridge will connect Clarissa street with the bridge over the Genesee river.

NARRON CENTRAL RAILROAD.—This company's plans call for building a line from Kenly, N. C., on the Atlantic Coast Line, northwest, to Zebulin, on the Norfolk Southern, about 20 miles. Track has already been laid on about seven miles. The line is being built to carry lumber, farm produce, cotton, tobacco and merchandise. N. Narron, president, and O. F. Watson, chief engineer, Kenly.

SOUTHERN RAILWAY.—Plans are being made by this company to build a new station at Cordova, Ala. The building will be of frame construction and will replace the structure destroyed by fire.

WESTERN MARYLAND.—A contract has been given to the Price Construction Company, Baltimore, Md., to put up a shop building at Hagerstown, Md. It is to be a brick structure with slag roof, and will be 34 ft. wide by 80 ft. long. The cost of the work will be $10,000.

Railway Officers

Executive, Financial, Legal and Accounting

G. B. Wall, vice-president of the Chesapeake & Ohio, has been appointed a vice-president also of the Hocking Valley, with office at Richmond, Va., and will perform such duties as the president may assign to him.

I. G. Ogden, vice-president of the Canadian Pacific, with office at Montreal, Quebec, has been relieved of some of his duties, to enable him to give his entire time to the financial department, and **John Leslie**, controller, has been placed in entire charge of the accounting department in all its branches.

James M. Kurn, who was elected vice-president in charge of operations and construction of the St. Louis-San Francisco, as has already been announced in these columns, was born at Mt. Clements, Mich., on October 4, 1870, and began railway work in 1885 as a telegraph operator on the Michigan Central. On November 1, 1887, he was appointed to a similar position on the Atchison, Topeka & Santa Fe, and during the succeeding five years served as operator and agent at various stations on that system, being promoted to train despatcher in 1892. He was later appointed superintendent of the Rio Grande division and on December 20, 1905, was transferred to the New Mexico division, where he remained until October 1, 1910, on which date he was appointed general superintendent of the western lines, with headquarters at La Junta, Colo. He resigned this position on January 1, 1914, to become president and general manager of the Detroit, Toledo & Ironton, with office at Detroit, Mich., which position he held for the last four years, until the date of his appointment, as noted above, effective March 1.

J. M. Kurn

Operating

Victor Parvin, trainmaster of the Virginian Railway, with office at Princeton, W. Va., has been appointed superintendent of the New River division, with office at Princeton, vice **L. R. Taylor**, resigned.

J. W. Cousins, has been appointed terminal superintendent of the Illinois Central, at New Orleans, La., succeeding **J. L. Beven**, granted leave of absence to enter government service, effective February 1.

R. B. Cooper was appointed trainmaster of the New Orleans division of the Yazoo & Missisippi Valley, with headquarters at Wilson, La., succeeding **M. G. Kennedy**, transferred, effective February 1.

H. A. Connett has been appointed chief train despatcher of the eighth and ninth districts, and the Park City branch, of the Union Pacific, with office at Evanston, Wyo., succeeding **V. A. Wirt**, promoted, effective February 23.

J. S. Bergman, assistant superintendent of the Winston-Salem division of the southern Railway, with office at Winston-Salem, N. C., has been appointed superintendent of the same division with office at Winston-Salem vice **J. M. Bennett.**

E. L. Desjardins, assistant superintendent of the Canadian Government Railways, with office at Levis, Que., has been appointed superintendent of the Moncton-Diamond Junction

district, with office at Edmundston, N. B., vice **A. R. Macgowan** resigned to go to another company.

Charles H. Hopkins, superintendent of the Southern division of the New York, Ontario & Western, with office at Middletown, N. Y., having resigned, **W. D. McQueen,** superintendent of the Scranton division, with office at Childs, Pa., has been appointed superintendent of the Scranton and Southern divisions with office at Middletown, and **N. S. Badger,** trainmaster at Childs, has been appointed assistant superintendent of the Scranton division, with office at Mayfield yard, Pa.

Engineering and Rolling Stock

W. H. Eyer has been appointed engineer and roadmaster of the Bloomsburg & Sullivan, with office at Bloomsburg, Pa., vice **William C. Fortune**, deceased.

B. J. Peasley, whose appointment as mechanical superintendent of the St. Louis-Southwestern of Texas, with office at Tyler, Tex., was announced in these columns on January 18, was born at Decorra, Ill., on December 21, 1867. He entered railway service at the age of 16 as laborer and machinist's apprentice with the Chicago, Burlington & Quincy, at West Burlington, Ia. On completing his apprenticeship he entered Elliott's Business College, at Burlington. Ia. After completing the business course he again entered railway service as a machinist with the Atchison, Topeka & Santa Fe, at Ft. Madison, Ia. In 1894 he was employed by the Ft. Madison Gas & Gasoline Engine Company; from 1895 to 1899 he was employed by the Chicago, Ft. Madison & Des Moines, as fireman and engineer. From 1899 to 1901 he was employed by the Illinois Central, at East St. Louis, Ill., as a machinist and was later promoted to division and wrecking foreman, at Carbondale, Ill. In 1901 he entered the service of the Denver & Rio Grande, as roundhouse foreman at Helper, Utah, where he remained a short time, returning to the Illinois Central, at East St. Louis, Ill., where he served in the capacity of roundhouse foreman, shop foreman and general foreman until September, 1906. He was appointed general foreman with the Missouri Pacific, at Bixby, Ill., in September, 1906, and was later promoted to master mechanic, at Ferriday, La., where he remained for six months and was then transferred to De Soto, Mo., as master mechanic of the Missouri division. In February, 1914, he was promoted to superintendent of shops at Argenta, Ark., where he remained until promoted as noted above.

B. J. Peasley

W. W. Appleton, general master mechanic of the Canadian Government Railways, with office at Moncton, N. B., has been appointed superintendent of motive power with office at Moncton, vice **G. R. Joughins,** who was superintendent of rolling stock; **W. E. Barnes,** master mechanic at Moncton, succeeds Mr. Appleton. The title of **G. E. Smart** has been changed from master car builder to superintendent of car department.

W. A. Randow has been appointed master mechanic of the first division of the Denver & Rio Grande, with headquarters at Pueblo, Colo., with jurisdiction over the entire division, with the exception of Burnham shops, vice **M. J. Powers** resigned, and the office of assistant master mechanic has been abolished. **H. C. Stevens,** master mechanic, with office at Alamosa, has been appointed superintendent of shops at Burnham. **J. L. Fagan,** master mechanic at Grand Junction, has been appointed master mechanic of the fourth division, with headquarters at Alamosa, vice Mr. Stevens. **F. T. Owens,** assistant master mechanic at Pueblo, has been appointed master mechanic, with office at Grand Junction, vice Mr. Fagan.

Traffic

G. W. Cushing has been appointed traffic manager of the Utah Railway, with headquarters at Salt Lake City, Utah.

G. E. Hill has been appointed commercial agent of the Lehigh Valley, with office at Newark, N. J., vice **C. H. Gulick.**

G. F. Brigham, general agent of the Chicago & North Western at St. Louis, Mo., has resigned to engage in other business.

F. E. Pittman, assistant treasurer of the Reid Newfoundland Company, with office at St. Johns, N. F., has been appointed general passenger agent, vice **J. W. N. Johnstone,** resigned.

Frank D. Austin, acting manager of the Mount Jewett Route, with office at New York, has been appointed assistant coal freight agent of the Erie, with office at New York, vice **Charles H. Horrell,** resigned to go into other business.

R. C. Cotner, traveling passenger agent of the Southern Railway, with office at Spartanburg, S. C., has been appointed division passenger agent with office at Spartanburg; **R. H. Graham** has been appointed division passenger agent, with office at Greenville; **E. P. Johnson,** traveling freight agent, at Jacksonville, Fla., has been appointed commercial agent, with office at Jacksonville, vice **T. D. Mullaly** and **U. G. Soule,** has been appointed commercial agent with office at St. Louis, Mo., vice **C. F. Lauer.**

Obituary

Robert A. Kutschbock, assistant general attorney of the New York Central, with headquarters at New York, died in a hospital in that city on February 28, at the age of 64. Mr. Kutschbock had served in the law department of the New York Central for about 34 years.

A. W. Wright, a railway construction engineer, died at Los Angeles, Cal., on February 3. He had charge of much of the construction of the Union Pacific in the early 60's and later of the Northern Pacific. He was also connected in an engineering capacity with a number of cable railways.

W. S. Danes, retired engineer maintenance of way of the Peru division of the Wabash, died at Chicago, Ill., on February 22, at the age of 65 years. He entered the service of the Wabash in 1880, as general foreman in charge of bridges and buildings. He was promoted to superintendent of bridges and buildings, and later to engineer maintenance of way of the Peru division, with headquarters at Peru, Ind., which position he held until retired.

Electric Locomotives for Manchurian Coal Mine.—The 50-ton electric locomotives for use by the Fushun collieries for freight handling are the first of the kind ever built at the South Manchuria Railway workshops. They are for the standard gage. Each locomotive is designed to haul 580-ton trains at the speed of 12.9 miles per hour on the level tangent track, exclusive of the weight of the locomotive, the trolley voltage being 1,200 volts. They are of the two-bogie type, each bogie carrying 125-horsepower motors. The total weight is 97,200 lb.; ballast weight, 15,200 lb.; weight on drivers, 112,400 lb.; weight per driving axle, 28,100 lb.; and weight of a motor, 5,000 lb.—*Commerce Reports.*

Italy Leads in Motor Car Exports.—Italy occupies the position of the leading motor car exporting nation of Europe, according to official figures issued by the Ministry of Finance. For the first eight months of 1917 her motor exports increased 113.4 per cent, as compared with the corresponding period of 1915, and 96.4 per cent as compared with the first eight months of 1916. The largest proportion of vehicles consisted of motor lorries despatched to the various Allied Powers. They numbered 6,169, and had an average value of 14.375 lire ($2,731) each. Touring cars totaled 506 for the eight months, their average value being 17,568 lire ($3,338) each. They were practically all fully equipped cars for Allied staff service.